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ABSTRACT

This program is a self-guided professional development experience that explains how to use multiple intelligences (MI) theory to improve teaching, learning, and achievement in elementary classrooms and schools. The program consists of one manual and six VHS videos, each of which corresponds to one of the six modules listed in the table of contents. Each module reflects one Pathway as presented in the professional development guide, "Pathways to Multiple Intelligences: A Guide to Thoughtful Practice." The modules contain: objectives and introduction; a video guide; units, lessons, and tools, with curricular suggestions, planning guides, and related resources; and additional readings. Each module takes between 1-2 hours to complete. The six modules are: (1) "Introduction to MI Theory"; (2) "Observing and Recognizing Multiple Intelligences"; (3) "Building on Strengths to Promote Literacy Skills"; (4) "MI Theory and Deepening Understanding"; (5) "MI Theory and Problem-Based Learning"; and (6) "Theory and Talent Development." (SM)

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ED 446 157

Multiple Intelligences: Theory to Practice in New York City Schools, Grades K-5 [Manual and Video Guide]

Marjorie Leopold

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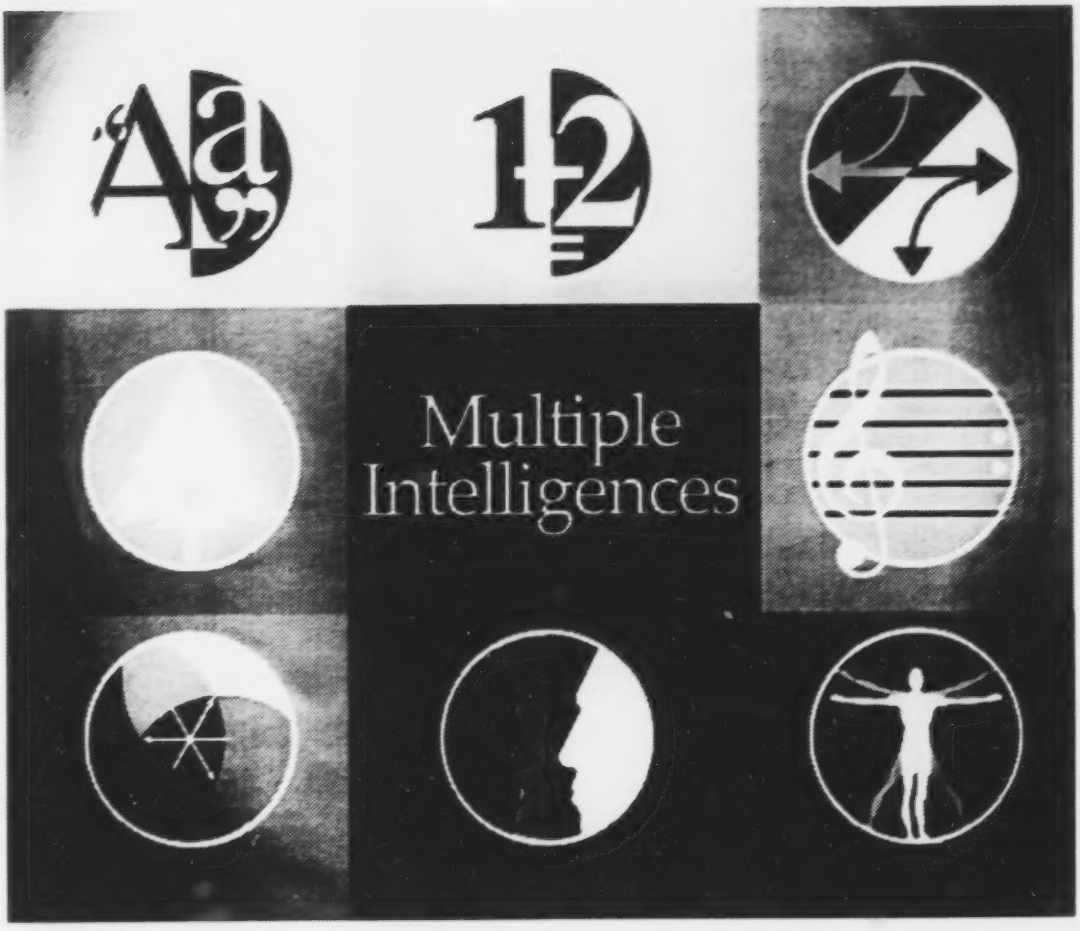

Grades K-5

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Phyllis Fernandez, producer/editor, and Marjorie Leopold, producer/writer, principals of Soup to Nuts Learning Resources, Inc., guided this program through its development. They have written, produced, customized, and facilitated numerous video-based, interactive programs for corporations, educators, and the public sector.

Dr. Susan Baum, Director of the Center for Talent Development, College of New Rochelle, Dr. Barbara Slatin, Principal of the Island School in CSD 1, and Julie Viens of Project Zero, Harvard University, developed the conceptual framework on which this program is based. Each module, II through VI, reflects one "Pathway," as presented in their professional development guide, *Pathways to Multiple Intelligences: A Guide to Thoughtful Practice* (forthcoming from Teachers College Press, New York). The Pathways model is based on their work over the past six years with teachers and schools across the U.S. and abroad.

Our appreciation goes to the narrator, Umar Abdul-Wali, Spark Counselor and teacher at Edward R. Murrow High School in Brooklyn, and to the following educators for their contributions to the MI Institute: Dr. Terry Neu and Dr. John R. Jablonski, with the Center for Talent Development at the College of New Rochelle; actors Christine Turner, A.J. Mass, and Debbie Rabbai, with ArtsConnections; David Pleasant of RiddimAthon!, Inc.

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HOW TO USE THIS PROGRAM

Welcome! You are about to begin a self-guided professional development experience that will demonstrate why and how you can use Multiple Intelligences theory to improve teaching, learning, and achievement in your classroom and your school. This comprehensive program of teaching strategies and curricular suggestions will take some time to implement, and so we tried to design a flexible program and offer several suggestions for implementation to get you started.

BRIEF OVERVIEW

This program consists of six modules. Modules contain the following:

- o Objectives and Introduction, offering a brief Pre-Reading
- o Video Guide, containing video segments, guided discussions, experiential exercises
- o Units, Lessons, and Tools, providing curricular suggestions, planning guides, and related resources to help you apply your learning
- o Additional Readings and Resources (in most modules)

TEAMS AND FACILITATORS

This program was designed with teacher teams in mind. While it is possible to work alone, it's always better to work with at least one other person, preferably a group. As you will soon see, you and your colleagues will bring multiple strengths to MI-based planning, practice, and reflection.

Your team may choose to have different members take turns as facilitators. Helpful roles for the facilitator might include:

- o Preview, when possible, the video and print materials that will be used in the session.
- o Gather materials, as specified for Modules I and IV.
- o Manage time.
- o Lead group in discussions as indicated in the Video Guide.
- o Summarize session and/or clarify interim assignments.
- o Initiate discussion based on individuals' interim practice.
- o Bring snacks – for obvious reasons!

WHAT HAPPENS AT A SESSION?

At any given session you and your team will

- o Read a brief introduction.
- o Watch and talk about video segments.
- o Experiment with activities.
- o Plan and review interim practice.

HOW LONG IS A SESSION?

The program was designed to be as flexible as possible. For practical purposes, each module takes between 1 and 2 hours; the longer modules can be easily divided into two sessions. We strongly suggest that you set aside two consecutive hours to complete Module I. Sessions may take more or less time depending on how you adapt the program to your particular professional development strategies.

WHERE AND WHEN?

All you need is a quiet classroom, with adequate space to try out experiential activities, and a television monitor with a VCR. Most pilot groups scheduled sessions at the same time each week, usually after school.

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Module V: MI Theory and Problem-Based Learning

Module VI: MI Theory and Talent Development

Module I
INTRODUCTION TO MULTIPLE INTELLIGENCES THEORY

OBJECTIVES

- Learn about and deepen understanding of each intelligence and the basics of MI theory
- Explore your own intellectual profile
- Gain insights from creating products and solving problems in areas of weakness and strength

VIDEO GUIDE

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*Segment 10 requires drawing and building materials, such as colored markers and large sheets of paper, and Legos™ (preferred) or other building sets.

PRE-READING

This pre-reading is for teachers who are new to MI theory or who want to review its most basic elements. The interactive video also presents MI basics in order to deepen your understanding of the theory.

WHAT IS THE SOURCE OF MI THEORY?

Dr. Howard Gardner's introduction to MI theory, *Frames of Mind,* was first published in 1983. This book openly challenged IQ theory—the widely-held belief that intelligence is a general trait, to be measured by picking the right answers on IQ tests. As it turned out, Gardner's ideas reflected the belief of many educators that there are multiple intelligences. In other words, there are many ways to be smart.

WHAT IS INTELLIGENCE?

Gardner defines intelligence as the psycho-biological potential to solve problems and create products that are valued by more than one culture. Multiple intelligences theory claims that intelligences are expressed in our performances, products, and ideas.

HOW IS THIS CLAIM SUPPORTED BY RESEARCH?

Gardner and his colleagues developed criteria for identifying an intelligence based on several sources, including brain research, human development, evolution, and cross-cultural comparisons. Each intelligence that emerged from their research has a universal, biological basis and operates relatively independently from the others. In addition, each intelligence satisfies the majority, but not all, of the criteria.The criteria are:

- potential isolation by brain damage
- existence of savants, prodigies, and other individuals distinguished by the presence or absence of specific abilities
- recognizable end-state and distinctive developmental trajectory
- an identifiable set of core operations
- evolutionary history and evolutionary plausibility
- support from experimental psychological tests
- support from psychometric findings
- susceptibility to encoding in a symbol system (Gardner, 1993).

THE INTELLIGENCES IN GARDNER'S OWN WORDS

(Checkley, 1997)

NATURALIST INTELLIGENCE designates the human ability to discriminate among living things (plants and animals), as well as sensitivity to other features of the natural world (clouds, rock configurations). This ability was clearly of value in our evolutionary past as hunters, gatherers and farmers. It continues to be central to such roles as botanist or chef. I also speculate that much of our consumer society exploits the naturalist intelligence, which can be mobilized in the discrimination among cars, sneakers, kinds of makeup and the like. The kind of pattern recognition valued in certain sciences may also draw upon the naturalist intelligence.

People with highly developed LOGICAL-MATHEMATICAL INTELLIGENCE understand the underlying principles of some kind of causal system, the way a scientist or a logician does; or can manipulate numbers, quantities and operations the way a mathematician does.

INTERPERSONAL INTELLIGENCE is understanding other people. It's an ability we all need, but is at a premium if you are a teacher, clinician, salesperson, or politician. Anybody who deals with other people has to be skilled in the interpersonal sphere.

INTRAPERSONAL INTELLIGENCE refers to having an understanding of yourself, of knowing who you are, what you can do, what you want to do, how you react to things, which things to avoid and which things to gravitate toward. We are drawn to people who have a good understanding of themselves because these people tend not to screw up. They tend to know what they can do. They tend to know what they can't do. And they tend to know where to go when they need help.

SPATIAL INTELLIGENCE refers to the ability to represent the spatial world internally in your mind—the way a sailor or airplane pilot navigates the large spatial world, or the way a chess player or sculptor represents a more circumscribed spatial world. Spatial intelligence can be used in the arts and the sciences. If you are spatially intelligent and oriented towards the arts, you are more likely to become a painter or a sculptor or an architect, than, say, a musician or a writer. Similarly, certain sciences, like anatomy or topology, emphasize spatial intelligence.

MUSICAL INTELLIGENCE is the capacity to think in music, to be able to hear music, to be able to hear patterns, recognize them, remember them, and perhaps manipulate them. People who have strong musical intelligence don't just remember music easily—they can't get it out of their minds it's so omnipresent. Now some people will say, "yes, music is important, but it's a talent, not an intelligence. I say, 'Fine, let's call it a talent.' But then we have to leave the word intelligent out of all discussions of human abilities. You know Mozart was damned smart.

BODILY KINESTHETIC INTELLIGENCE is the capacity to use your whole body or parts of your body—your hand, your fingers, your arms—to solve a problem or to make something, or put on some kind of production. The most evident examples are people in athletics or the performing arts, particularly dance or acting.

LINGUISTIC INTELLIGENCE is the capacity to use language, your native language, and perhaps other languages to express what's on your mind and to understand other people. Poets really specialize in linguistic intelligence, but any kind of writer, orator, speaker, lawyer, or a person for whom language is an important stock in trade highlights linguistic intelligence.

NATURE AND NURTURE?

As human beings we all have potential in all of the intelligences. MI theory is not saying we're born with particular strengths or limitations. Whether, and to what extent, our particular intelligences develop is the result of nature and nurture: the interaction between our experiences and our potential. Therefore, the more time we spend developing an area of intelligence, the smarter we become within that area, especially if we benefit from good resources and instruction.

LEARNING STYLES AND MULTIPLE INTELLIGENCES

Both learning styles research and MI theory are useful for getting to know your students better. They are not the same thing, however.

Gardner says multiple intelligences theory indicates that we respond, individually, in different ways, to different kinds of content, such as music or language or other people. This is very different from the notion of a learning style. Learning styles refer to the cross-contextual preferences in how we take in information.

Gardner suggests that from a multiple intelligences perspective a child might be characterized as follows: "Here is a child who very easily represents things spatially, and we can draw upon that strength if need be when we need to teach the child something new" (Checkley, p.13).

We can use both constructs when we consider young learners. Learning styles refer to diverse ways of receiving information in terms of sensory modalities (i.e., auditory, visual, or tactile) and social contexts (i.e., extrovert, introvert, field sensitive or field independent). Another learning style approach describes how one takes in information, such as logical sequential (a linear, chronological, or step-by-step sequence) or convergent approach (a nonlinear, inductive approach to information).

MI theory is not against thinking about students' learning styles, neither is it describing the same phenomenon. Each is a tool with subtle and more obvious differences that can lead to different ways of thinking and approaching the teaching and learning context. Any tool that can help us reach learners is worth considering. For more regarding MI theory and learning styles see Baum, et. al. (forthcoming).

VIDEO GUIDE

SEGMENT 1: THE NATURALIST INTELLIGENCE

WHAT TO EXPECT

These short video segments consist of a brief introduction by the narrator and a description of the naturalist intelligence, followed by seven brief segments, one for each intelligence. Pause cues let you stop and discuss each intelligence, which is recommended if you are new to MI theory or want to review with your colleagues.

Who: Umar Abdul-Wali, Spark Counselor at Edward R. Murrow High School and narrator for this program

What: Mr. Wali explains how we view objects through the lens of the naturalist intelligence and further explains this intelligence.

Where: The Farmers' Market at Union Square in Manhattan

Why: To illustrate the focus of our thinking when the naturalist intelligence is engaged

PLAY TAPE: THE NATURALIST LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION: THE NATURALIST INTELLIGENCE

SUGGESTED TIME: 5-10 MINUTES

You may want to refer to Gardner's description of the naturalist intelligence from the pre-reading and view the video segment again before this discussion.

DISCUSSION QUESTIONS

- What stood out for you in the Farmers' Market? What did *you* see?
- Pattern recognition in the naturalist intelligence refers to discriminating and identifying patterns in living systems and in the natural world. What are the patterns from a naturalist perspective *you* noticed in the Farmers' Market?

APPLY YOUR UNDERSTANDING

1. Here are some common tasks of a professional chef. According to the definition of naturalist intelligence, discuss whether and in what ways the chef uses aspects of naturalist intelligence to perform each of the following:

- Selecting textures of ingredients
- Arranging food artfully on a plate
- Choosing complementary tastes of ingredients
- Identifying colors that indicate freshness
- Determining cost of meal

2. Here are some tasks of a marine biologist. Discuss whether and in what ways a marine biologist uses naturalist intelligence to perform these tasks.

- Observe plankton eaters' feeding patterns
- Plan and participate in diving expeditions
- Determine similarities and differences in zooplankton
- Write and present research for peer review

3. Here are some tasks of ecologists. Discuss whether and in what ways an ecologist uses naturalist intelligence to perform each task.

- Track soil and atmospheric changes based on logging in the Amazon rain forest
- Write popular books to organize support for natural resource management
- Develop curriculum and teach ecology
- Study population dynamics of wildlife in an area

4. In what contexts do you use your naturalist intelligence?

Begin by choosing a domain or role and creating a bulleted list of related activities. Then discuss whether and in what ways you use naturalist intelligence for these tasks. Remember, not all activities in a particular domain will call on naturalist intelligence.

SEGMENT 2: THE LOGICAL-MATHEMATICAL INTELLIGENCE

WHAT TO EXPECT

In this example of logical-mathematical intelligence the Louis Armstrong Middle School students are trying to create a three-dimensional model of the universe. You'll see these students again in Module IV.

Who: Umar Abdul-Wali

What, Where, and Why: SAME CONTEXT AS IN SEGMENT 1

PLAY TAPE: THE LOGICAL-MATHEMATICAL LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

You may want to refer to Gardner's description of logical-mathematical intelligence from the Pre-reading and view the video segment again before this discussion.

EXAMPLES

Consider the following examples or products of logical-mathematical intelligence. How does your logical-mathematical intelligence help you explain or understand the information in each example? (These examples come from the Internet and are not independently verified.)

The following is a process for film developing.

EXAMPLE 1

CHEMICAL FORMULA FOR DEVELOPING PHOTOS
BY BJORNB@CRIS.COM

EXPOSE AT ISO25, DEVELOP 6 MIN. AT 68 DEG. F.

Hot water(125 deg. F)	750 cc
Metol	1 g
Sodium sulfite, monohydrate	10 g
Sodium tetraborate (borox)	2 g
Boric acid	1 g
Water to make (distilled)	1000 cc

EXAMPLE 2

STOCK QUOTE

Last price	61 7/8
Change	UP 3/4 (+1.23%)
High	62 15/16 at 9:53 EDT
Low	61 1/2 at 9:34 EDT
Open	61 7/8
Previous close	61 1/8 on 7/22

EXAMPLE 3

COMPUTER PROGRAM

The command to move the number 255 into a CPU register, or memory location, might look like this:

MoVe Immediately to register value FF (hexadecimal for 225)... *or*
MVIA,OFFN ...*or*
0011111011111111

EXAMPLE 4

BASEBALL STATISTICS

EAST	W	L	PCT	GB
New York	57	37	.606	–
Boston	52	44	.542	6
Toronto	52	45	.536	6 1/2
Baltimore	42	53	.442	15 1/2
Tampa Bay	41	55	.427	17

DISCUSS YOUR UNDERSTANDING

In what contexts do you rely on your logical-mathematical intelligence?

YOUR NOTES

SEGMENT 3: THE INTERPERSONAL INTELLIGENCE

WHAT TO EXPECT

This video illustration features Mary Pree and some of her students from the Island School in District 1. You will see more of this class in subsequent modules.

Who, What, Where, and Why: SAME CONTEXT AS IN PRIOR SEGMENTS

PLAY TAPE: THE INTERPERSONAL LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

You may want to refer to Gardner's description of the interpersonal intelligence and view the video segment again before this discussion.

1. How did the students in this segment use their interpersonal intelligences? (Note that interpersonal intelligence does not refer to an extroverted personality.)

_____
_____
_____
_____
_____

2. How did the teacher in this segment use her interpersonal intelligence?

_____
_____
_____
_____
_____

YOUR NOTES

SEGMENT 4: THE INTRAPERSONAL INTELLIGENCE

WHAT TO EXPECT

The student who speaks in this video segment is a playwright from E. R. Murrow High School. His play was recently selected for a professional reading by an Off-Broadway theater.

Who, What, Where, and Why: SAME CONTEXT AS IN PRIOR SEGMENTS

PLAY TAPE: THE INTRAPERSONAL LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

Note that intrapersonal intelligence is sometimes confused with an introverted personality. Once again, an intelligence refers to how we solve problems or create products, not to a personality type.

APPLY YOUR UNDERSTANDING

Reflect on a decision you've made in your life that reflected good use of intrapersonal intelligence.

YOUR NOTES

SEGMENT 5: THE SPATIAL INTELLIGENCE

WHAT TO EXPECT

The students in this example are building with Kapla™ Blocks, recreating photographic illustrations. Later in the video series you will see how this activity is an entry point for writing narrative procedures.

Who, What, Where, and Why: SAME CONTEXT AS IN PRIOR SEGMENTS

PLAY TAPE: THE SPATIAL LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

EXPAND YOUR UNDERSTANDING

Refresh your memory:

> As Mr. Wali says: "Spatial intelligence allows us to perceive and make use of visual and spatial information."

Spatial intelligence is tapped when we:

- Navigate within the spatial world,
  i.e., drive a car; pilot a plane; or determine routes to a destination using subway and/or bus maps.
- Perform surgery.
- Set up a loom.
- Play chess or other positional board games.
- Play computer action games.
- Create visual images, in two or three dimensions,
  i.e., draw (maps, figures, landscapes, etc.), paint, illustrate, sculpt, apply makeup.
- Create graphic designs, architectural designs, industrial designs.
- Construct three-dimensional models and finished three-dimensional products, ranging from jewelry to rollercoasters.
- Arrange furniture in a room, food on a plate, or flowers in a vase.
- Choose outfits for special occasions.

DISCUSS YOUR UNDERSTANDING

Based on the video and print definition and examples of spatial intelligence, discuss the contexts in which you most often use your spatial intelligence and whether and why you think it is one of your strengths.

SEGMENT 6: THE MUSICAL INTELLIGENCE

WHAT TO EXPECT

In this example of musical intelligence, students at Louis Armstrong Middle School are trying to compose music to suggest different topographical formations. You'll see them again in Module IV.

Who, What, Where, and Why: SAME CONTEXT AS IN EARLIER SEGMENTS

PLAY TAPE: THE MUSICAL LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

EXPAND YOUR UNDERSTANDING

Music is a domain. Gardner uses the term "domain" to refer to any real-world activity at which you can get better. Musical intelligence is what we primarily use to engage in the domain of music, whether playing an instrument or singing, actively listening to music, and/or dancing (or simply moving) to musical rhythms. Sound engineers also use this intelligence in the domains of recording and mixing or editing music and other audio material. Their job requires them to make decisions based on careful and expert listening to rhythms, pitch, tonal quality, volume, etc.

Musical intelligence is minimally engaged (or not at all engaged) when music is simply the background for another activity. However, the more actively involved we are in music making or music listening, the more our musical intelligence is truly engaged.

DISCUSS YOUR UNDERSTANDING

- Based on the video and print definition and examples of musical intelligence, discuss the contexts in which you most often use your musical intelligence and whether and why you think it is one of your strengths.
- Can you share a teaching idea or actual experience in which music served as a way to activate students' procedural memory, or engage interest, and/or improve understanding?

SEGMENT 7: THE BODILY KINESTHETIC INTELLIGENCE

WHAT TO EXPECT

In this example the students at the Edward R. Murrow High School are in an acting class, using their bodily kinesthetic intelligence in an improvisation activity. You'll see them again in Module VI.

Who, What, Where, and Why: SAME CONTEXT AS IN EARLIER SEGMENTS

PLAY TAPE: THE BODILY KINESTHETIC LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

EXPAND YOUR UNDERSTANDING

Bodily kinesthetic intelligence is engaged by any activity that uses large or small muscle groups. Bodily kinesthetic intelligence is tapped when we dance, act, and play sports. Eye-hand-coordinated tasks, such as keyboarding, drawing, building, even surgery also tap this intelligence.

DISCUSS YOUR UNDERSTANDING

- Based on the video and print explanation of bodily kinesthetic intelligence, discuss the contexts in which you most often use your bodily kinesthetic intelligence and whether and why you think it is one of your strengths.
- Can you share a teaching idea or experience in which bodily kinesthetic intelligence served as a way to engage interest and/or improve understanding?

SEGMENT 8: THE LINGUISTIC INTELLIGENCE

WHAT TO EXPECT

In this example students at an Edward R. Murrow High School language arts class use their linguistic intelligence in an activity you'll see again in Module II.

Who, What, Where, and Why: SAME CONTEXT AS IN EARLIER SEGMENTS

PLAY TAPE: THE LINGUISTIC LENS
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

EXPAND YOUR UNDERSTANDING

Linguistic intelligence is used across many domains to express understanding. For example, naturalists tap linguistic intelligence to describe attributes of plants, animals, clouds, or rocks, or other patterns in living systems and the natural world.

Often linguistic intelligence is combined with one or more other intelligence(s) to produce a written product. For example, a problem might be primarily addressed and solved by the naturalist, musical, interpersonal, intrapersonal, spatial or logical-mathematical intelligence, and be *expressed* in the form of a written product.

Review the following three examples of linguistic products. After you've read them, please consider which other intelligences are also engaged through these linguistic expressions.

EXAMPLE 1

Often quoted line from JFK's inaugural address:

"Ask not what your country can do for you, but what you can do for your country."

EXAMPLE 2

Recipe for balsamic vinaigrette:

3 parts olive oil

1 part balsamic vinegar

1 clove crushed garlic

salt and freshly ground black pepper, to taste

EXAMPLE 3

The Sound of Silence

Hello darkness, my old friend,
I've come to talk to you again,
Because a vision softly creeping,
Left its seeds while I was sleeping,
And the vision that was planted in my brain, still remains
within the sound of silence.

Words and Music by Paul Simon, 1964, BMI

Permission pending

What other linguistic products come to mind that engage other intelligences to a significant extent?

YOUR NOTES

SEGMENT 9: INTELLIGENCE PROFILES

BACKGROUND

While there are eight separate intelligences, we very rarely see them expressed separately. We can observe the intelligences in action within *domains* (defined as real-world activities in which an individual can improve).

In all domains, including occupations, we use a combination of certain intelligences while often relying on particular intelligences.

WHAT TO EXPECT

This video sequence illustrates intelligence profiles of individuals in four different professions. After this video sequence you will be invited to try an activity that will point out some of your own strengths and affinities.

Note that all chefs are not like Melissa Cary. These illustrations should not encourage stereotypical thinking. Profiles are unique to each individual.

Who: Umar Abdul-Wali

What: Four individuals with different intelligence profiles are presented

Why: To demonstrate how meaningful activities and pursuits draw on a combination of intelligences

PLAY TAPE

PAUSE TAPE FOR ACTIVITY

ACTIVITY: PERSONAL MI GRAPH

SUGGESTED TIME: 10–15 MINUTES

This activity is offered to help you begin to consider and understand your intellectual strengths and affinities. Think of it as a starting point, rather than a definitive assessment.

Directions (Baum 1999)

1. The Personal MI Graph on page 21 lists twenty-two activities or affinities in the first column. Circle any that you feel apply to you.
2. Use the space provided at the bottom of the first column to add and then circle a domain that applies to you that is not represented in the original list of twenty-two.
3. Next, analyze what attracts you about the activities you circled and how you engage in them from a multiple intelligences perspective. Put an X in the columns pertaining to those intelligences you feel best explain what draws you to each circled activity or affinity.

   For instance, if you like to garden, is it because you like to dig in the dirt, rake, and pull weeds? If so, the bodily kinesthetic intelligence may explain your involvement. If you are mostly interested in creating an aesthetically pleasing landscape of colors, sizes, and textures, then for you gardening might be a mostly spatial activity. Perhaps you are fascinated with hybrid variations of plants or light and soil variables as they relate to your garden, in which case the

naturalist intelligence might primarily guide your interest.

It is possible that two or more aspects of the gardening experience are compelling to you. Notice how in Sue's Graph she put an X in both spatial and naturalist for the item "Takes Photos" when she realized that she mostly takes pictures of animals in their natural habitat.

Consider the activity of journal writing as another example. Usually journal writing taps intrapersonal and linguistic intelligences. But do you draw pictures in your journal to express your feelings? If you do, you would place an X in both spatial and intrapersonal columns. Perhaps you use your journal to record your financial transactions, thus tapping your logical-mathematical intelligence.

4. When you have completed filling in the graph, see if you can note any patterns about your particular intellectual strengths. Which intelligences seem to underlie your engagement or attention? Total the columns to obtain a quantitative representation. Please note, however, that just one X may be so qualitatively powerful that it points to a context in which your intelligences truly flourish.
5. Discuss your results with your colleagues. How the intelligences work together in domains will become increasingly apparent as you work through the learning activities in this program.

Analysis of Sue's MI Graph. Sue agrees, as she thinks about her life, that her strongest intelligences are her personal intelligences. She also thinks that bodily kinesthetic is an undeveloped area, except when speaking publicly, where she performs in front of an audience. In these situations, her use of her body, facial expressions and voice all contribute to her effectiveness.

There is an additional blank Personal MI Graph in the Units, Lessons, and Tools section of this module. Feel free to duplicate and share it with others. Remember, this activity is a starting point, not a definitive assessment of your intelligences profile. If you customize this instrument to use with your students, be careful not to label the children. Rather, find contexts where their intelligences profiles allow them to demonstrate their personal bests.

After you and your colleagues have completed and discussed your personal MI graphs, it is suggested you take a short break. There is another 45–60 minutes of video time and activities in this module.

PERSONAL MI GRAPH (Baum, 1999)

ACTIVITY OR AFFINITY	NATURALIST	LINGUISTIC	LOGICAL MATHEMATICAL	INTER-PERSONAL	INTRA-PERSONAL	SPATIAL	BODILY KINESTHETIC	MUSICAL
Enjoys doing family accounting								
Loves logical puzzles								
Plays musical instrument								
Loves biographies								
Crossword fan								
Keeps a journal								
Can say "no"								
The local therapist								
Hikes								
In theater group								
Writes music								
Enjoys handicrafts								
Builds & renovates								
Reads poetry								
Takes photos								
Ran for office								
Enjoys writing								
Change agent								
Skis								
Studied dance								
In music group								
Gardener								
*								
Totals								

*Fill in an activity or affinity that is not represented in this list.

SUE'S MI GRAPH (Baum, 1999)

ACTIVITY OR AFFINITY	NATURALIST	LINGUISTIC	LOGICAL MATHEMATICAL	INTER-PERSONAL	INTRA-PERSONAL	SPATIAL	BODILY KINESTHETIC	MUSICAL
Enjoys doing family accounting			X					
Loves logical puzzles			X					
Plays musical instrument		X		X				
Loves biographies								
Cross-word fan		X						
Keeps a journal		X			X			
Can say "no"					X			
The local therapist				X				
Hikes								
In theater group								
Writes music								
Enjoys handicrafts								
Builds & renovates								
Reads poetry								
Takes photos	X					X		
Ran for office								
Enjoys writing								
Change agent				X	X			
Skis								
Studied dance								
In music group								
Gardener								

SEGMENT 10: SIMULATION: NOVICE VS. EXPERT

BACKGROUND

A central idea in putting MI theory to work in the classroom is building on students' strengths, both as a way to meet basic academic requirements and as a way to learn and demonstrate in-depth knowledge. Rather than focus solely on a remedial approach, which addresses correcting students' weaknesses, educators using MI focus on students' strengths to help them learn.

To demonstrate this idea, MI experts have devised a simulation activity to help teachers experience and value their own strengths, as well as allow them to experience, firsthand, what their students might feel and what they might do when limited to working in areas in which they feel they have little or no talent.

WHAT TO EXPECT

Who: Teachers (yourselves and those in a videotaped simulation experience)

What: A simulation that illustrates effects and outcomes of working from areas of strength and from areas of weakness

Where: Your MI workshop, and on videotape at the MI Institute for NYC Teachers

Why: Learn how people tend to behave when operating from a position of intellectual strength and from a position of weakness.

ACTIVITY: MINI SIMULATION (Adapted from Baum, 1995)

SUGGESTED TIME: 15 MINUTES

This activity is an abbreviated version of a simulation to be ideally conducted with a group of 25 or more teachers. You are now asked to do a scaled-back version of this activity, in preparation for viewing the videotaped activity as it unfolded with a group of 60 teachers at the MI Institute for NYC Teachers. Try this activity with your small group (even two or three teachers). The full simulation appears in Units, Lessons, and Tools. It is hoped that you might want to facilitate the entire simulation with a larger group of teachers at your school to interest them in learning more about MI.

Part I

Each individual has preferred modes of solving a problem and developing products. Some are at their best when they can visualize a solution to a problem and communicate through the visual arts. Others may prefer the performing arts, writing, or engineering and design.

1. Rate your perceived ability or level of development in each of the following domains: writing, drawing, performing arts, and engineering (model building), with 1 being the most "expert" and 4 being the most "novice."

   writing___ drawing___performing arts ___ engineering___

2. Spend a few minutes discussing with your colleagues what you chose as number 1 (expert) and number 4 (novice).
3. Group yourselves into "novice" groups by domain. In other words, whoever picked "performing" as number 4 should work together. If there is only one of you in a domain, work alone.
4. The task: Your class has been studying colonial America. Each novice group is required, using the targeted form of expression, to create a product that depicts three aspects of life for children

living in colonial American settlements. Take approximately 5 minutes to complete your product.

GROUP	MATERIALS	PRODUCTS
Writing	Paper and pencil	Must be written down
Drawing	Drawing materials	Must be illustrated without verbal explanations
Engineering	Lego™ bricks	Must build items that are recognizable without verbal explanations
Performing arts	A corner to plan	Must be a performance (pantomime or monologue is fine)

5. When the time is up, share your product.

Part II

6. The entire process is then repeated. This time, regroup in your expert area. The instructions remain the same. When the time is up (approximately five minutes), share your product again.

7. Take a few more minutes to talk about the difference in your process and product.

In which experience did you:

- rely on each other?
- seem more confident and independent?
- seem actively involved over time?
- manifest stress?

Which condition resulted in the better product and showed more skill or talent?

Which experience resulted in a product that showed the most attention to detail?

In which experience did it seem like you had more knowledge?

In which experience was creativity used to compensate for lack of skill or comfort?

In which experience was creativity used to enhance the quality of the product?

In which experience did you use your strongest intelligences?

WHAT TO EXPECT

Who: NYC teachers in the videotaped simulation experience

Why: Learn how a large group of teachers reacted to the simulation exercise and what insights about MI emerged from this experience

WHAT TO FOCUS ON

Refer to the Focus Guide on the following page. In much the same way you discussed some of your own reactions to the mini-simulation, observe the teachers' behaviors at the MI Institute. After you view the video segment you'll be asked to discuss your observations using the Focus Guide to prompt your analysis.

PLAY TAPE: SIMULATION: NOVICE VS. EXPERT
PAUSE TAPE FOR DISCUSSION

DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

Use the Focus Guide questions to analyze how teachers in the video segments responded to the simulation.

FOCUS GUIDE

(Adapted from Baum, 1995)

ROLE OF GROUP — NOVICE — EXPERT

In what ways did the members of the group rely on each other?
In which experience did participants seem more confident and independent?

TIME ENGAGED ON TASK — NOVICE — EXPERT

In which experience were participants actively involved over time?

QUALITY OF PRODUCT — NOVICE — EXPERT

Which condition resulted in the better product and showed more skill or talent?

ATTENTION TO DETAIL (ELABORATION) — NOVICE — EXPERT

Which experience resulted in a product that showed the most attention to detail?

BREADTH AND DEPTH OF KNOWLEDGE — NOVICE — EXPERT

In which experience did it seem like the participants had more knowledge?

CREATIVITY — NOVICE — EXPERT

In which case was creativity used to:
- compensate for lack of skill or comfort?
- enhance the quality of the product?

STRESS (CAUSES OR MANIFESTATIONS) — NOVICE — EXPERT

When were participants experiencing stress?
Which behaviors were manifestations of stress?

INTELLIGENCES USED:

Which intelligences did the participants use to:
- complete the product in particular domains?
- compensate for intelligences related to the novice area?

What conclusions can you draw about using strength-based education?

SEGMENT 11: SUMMARY OF MODULE I

WHAT TO EXPECT

A brief review of the key points derived from the Novices vs. Experts Simulation.

Who, What, Where, and Why: SAME CONTEXT AS IN EARLIER SEGMENTS

PLAY TAPE

Conclude video portion of Module I and outline content of Modules II–VI.

By this time you've recognized there is a viable educational rationale for recognizing and nurturing students' strengths as a way to help them become successful lifelong learners. Using the approach of Baum, Slatin and Viens, the following modules provide practical applications of multiple intelligences theory.

Recognizing students' abilities is the first step in planning personalized educational experiences. To this end, in Module II you'll observe teachers who develop purposeful ways to nurture their students' intelligences and discover their students' individual strengths within the context of meeting their curricular goals. Several approaches illustrate teachers creating opportunities in a range of domains for students to **discover** and **explore** their intelligences and for both teachers and students to identify their combinations of interests and strengths. This guide will provide examples of MI observation tools to use to observe and recognize students' multiple intelligences at work in different domains.

In **Module III** you'll observe a variety of approaches to creating opportunities to bridge students' strengths and interests with basic literacy skills. It is recommended that you complete Modules I, II and III consecutively. You may want to change the order for Modules IV, V, and VI, depending on your time and interests.

Module IV focuses on how to use MI theory to encourage students' deepening understanding of complex concepts. You'll observe diverse instructional and assessment strategies that give students subject entry points in ways that align with their unique abilities. This approach also allows students MI-based options to demonstrate their in-depth understanding.

Module V addresses using MI theory to design real-world projects and problem-based learning. Students assume the role of practicing professionals and use their multiple intelligences to solve real-world problems and strengthen basic skills at the same time.

Module VI focuses on developing programs that identify and nurture students' talents. This approach creates a context to assist students at promise on their journey from novice to expert in a particular domain. This approach often depends on specially designed extracurricular experiences offering advanced challenges as the learner demonstrates interest and readiness.

INTERIM AND ENHANCEMENT ACTIVITIES

In Module I you have been introduced to the theory of multiple intelligences and have begun to assess your own areas of intellectual strength. In Module II you will learn more about recognizing intelligences, with a focus on nurturing your students' intelligences and observing your students through an MI lens as you achieve your curricular goals. Between now and then begin to do your own informal observations of multiple intelligences in your classroom, and be prepared to share your observations with your colleagues at your next session.

In the following Units, Lessons, and Tools section of this module, you will find instructions for conducting the large-group simulation, similar to the one you observed on the video of the MI Institute. We suggest that you and your colleagues offer to facilitate this activity at a faculty meeting at your school as a way of sharing your insights about MI theory and a strengths-based approach to teaching and learning.

UNITS, LESSONS, AND TOOLS

NOVICE VS. EXPERT SIMULATION
(Baum, 1995)

DIRECTIONS FOR THE FACILITATOR

1. To begin the simulation, discuss with the group how each individual has preferred modes of solving a problem and developing products. Some are at their best when they can visualize a solution to a problem and communicate through the visual arts. Others may prefer the performing arts, writing, or engineering and design. Tell them to rate their self-efficacy or perceived ability or level of development in each of the following domains: writing, drawing, performing arts, and engineering (model building). Have each person rank the following four choices in terms of their level of talent or expertise, with 1 being the most expert and 4 being the most novice. Record the number of responses for each group. You will need this information to form groups later on. When you have completed your rankings, complete the following tally sheet:

TALLY

Number who listed drawing first:___

Number who listed engineering first:___

Number who listed writing first:___

Number who listed performing first:___

TALLY

Number who listed drawing last:___

Number who listed engineering last:___

Number who listed writing last:___

Number who listed performing last:___

2. There are two parts to this simulation. Part one involves grouping the participants into novice groups (domain least preferred). Part two involves grouping them into expert groups (domain most preferred). The ideal number of participants in each group should range from 4 to 10. If a group is too large, consider splitting the group in half or having several people switch to their second-most-preferred or second-least-preferred choice.

3. Once you have grouped the participants into their novice groups, you are ready to begin the simulation. Tell the participants to imagine that they are in your fifth-grade class and will be working on group projects. The class has been studying colonial America and each group is required to create a product that demonstrates three aspects of life for children during colonial America. Each novice group is to create one group product in that area. The product must reveal at least three aspects of colonial children's lives using the targeted form of expression. The group passes if the rest of the class can recognize the three aspects of colonial life for children; it fails if they cannot. In essence, there should be four groups who receive the following instructions:

(Baum, 1995)

GROUP	MATERIALS	PRODUCTS
Writing	Paper and pencil	Must be written down
Drawing	Color markers and paper or transparencies (if you have overhead projector)	Must be illustrated without verbal explanation
Engineering	Lego bricks	Must build items that are recognizable without verbal explanations
Performing arts	Space outside the the classroom	Must be a performance

4. Assign an observer to each group. Observers can be recruited from the larger groups. Allow each group about ten to fifteen minutes to complete its product. The observer records the time on task, the group dynamics, any avoidance behaviors, the level of enthusiasm, and the group's standards for success, and any other observations about the process.
5. When the time is up, each group must share its product in the following way: The performing arts group performs in front of the larger group as their audience, and the drawing group shares its transparencies on the overhead projector (or displays their drawings on paper). Both must ask the audience to try to identify the three aspects of colonial life as illustrated in their products. A person from the writing group reads the written product, and the builders display their product at the front of the room with the audience identifying the aspects of colonial life. After the products are shared, the observers from each group share their observations.
6. The entire process is then repeated. This time the participants are regrouped into their preferred or expert area. The instructions remain the same. The observers remain with their initial assigned area so that they are able to compare the differences in the process when participants are working in an area of strength as compared to a novice or least preferred area. More time may be needed, as the groups will tend to be more elaborate and have higher standards for success.
7. Upon completion of the products, have the groups share their work and the observers present their findings as in the first group activity.

The following pages provide some debriefing notes and a debriefing chart for use by a facilitator.

DEBRIEFING FOR FACILITATOR

We find that the second set of "expert" products is superior to the first. It usually will appear that the second expert group will know more about the colonial period than the first group. In reality, the knowledge level will not have changed. What will have changed is the avenue through which the participants are allowed to express their knowledge of colonial America. In the first activity, the groups are restricted or confined by their ability to draw, write, build, or perform. For instance, they may have known that colonial children got water from a well but were not able to successfully sketch a picture of a well because they couldn't remember enough visual details. In the second group, however, the more talented artists usually can draw anything successfully.

It is important to conduct a discussion in which you compare the experiences in both activities. You may want to cover the following aspects of the experience: role of the group, creativity, enthusiasm, time on task, noise level, quality of the product, level of details, and the level of knowledge.

In most cases, in experience one, the role of the group is supportive. The group will see the benefits of working with other novices when first learning or trying something new. In the second experience, the members of the group are more independent, confident, and may prefer to work on their own. Creativity is used differently in both experiences. In the first, it is used to avoid the task, or to find clever ways to compensate for lack of talent. In the second experience, the creativity is shown in the enhancement and quality of the product. Participant enthusiasm is usually much higher in the second experience. However, on occasion, in the second activity the participants feel pressured to be perfect because they have admitted that they are talented in this area. In the first experience, they perceived the expectation to be much lower while in actuality the criteria for passing the task remained the same. As will become evident, the time on task will greatly increase when students are working in their talent area. Likewise, the quality of the products in the second phase of the simulation will be far superior to the first phase. In fact, all participants will seem exceptionally talented. Most interesting, the knowledge the participants will have displayed about colonial America will seem much greater during phase two. The participants will seem more knowledgeable and go beyond the minimal expectations of the assignment.

You can use the charts on the following pages to direct discussion regarding these points.

DEBRIEFING THE SIMULATION

(Baum, 1995)

	NOVICES	EXPERTS
ROLE OF GROUP In which situation did you rely more on your group as a necessary support? In which experience did you feel more independent? What conclusions can you draw?		
TIME ON TASK In which experience were you actively involved over time?		
QUALITY OF PRODUCT Which condition resulted in the better product and showed more skill or talent?		
ELABORATION Which experience resulted in a product that showed the most attention to detail?		
KNOWLEDGE In which product did it seem like the participants had more knowledge?		
CREATIVITY In which case was creativity used to: • compensate for lack of skill or comfort? • enhance the quality of the product?		
INTELLIGENCES USED When did you use an area of strength to compensate for an area of difficulty?		
STRESS Which condition caused more stress for you? Why? What are the implications of this?		

The following points might be drawn out to summarize the experience.

WRITERS – Will have no problem using language or words to communicate their knowledge of the topic. They will often play with words in creative ways to achieve their desired goal.

ARTISTS – Will attend to and remember visual details and will have no problem recreating images on paper. Their knowledge and creativity will be shown in the visual product. In short, they will use drawing to communicate what they know rather than just "tell" what they can draw.

ENGINEERS – Will notice how things are put together and how they work. They will have no difficulty getting their hands to create working models and prototypes. Their understanding of the content will begin with this focus. Their creativity will find new methods of conceptualizing the problem since they will not be limited to what they know how to build.

ACTORS – Have enjoyment of and flair for the dramatic. They understand how to use voice, mood, dialogue, and timing to communicate their message to the audience. Their creativity allows them to find innovative ways to integrate music, dance, set design, and props to enhance their performance. Such additions are indicators of the knowledge they have about the topic.

PERSONAL MI GRAPH (Baum, 1995)

ACTIVITY OR AFFINITY	NATURALIST	LINGUISTIC	LOGICAL MATHEMATICAL	INTER-PERSONAL	INTRA-PERSONAL	SPATIAL	BODILY KINESTHETIC	MUSICAL
Enjoys doing family accounting								
Loves logical puzzles								
Plays musical instrument								
Loves biographies								
Cross-word fan								
Keeps a journal								
Can say "no"								
The local therapist								
Hikes								
In theater group								
Writes music								
Enjoys handicrafts								
Builds & renovates								
Reads poetry								
Takes photos								
Ran for office								
Enjoys writing								
Change agent								
Skis								
Studied dance								
In music group								
Gardener								
*								

*Fill in an activity or affinity that is not represented in this list.

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Module II
OBSERVING AND RECOGNIZING MULTIPLE INTELLIGENCES

OBJECTIVES

To consider guidelines for

- Setting up a classroom environment that provides all students with opportunities to engage their multiple intelligences
- Observing students within a variety of contexts, for the purpose of identifying their strengths

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The purpose of this module is to help teachers create MI-rich environments and focus their observations on students' multiple intelligences to identify and subsequently build on their strengths. In so doing, there are several challenges to observing students well. Professor A.J. Tannenbaum of Teachers College, Columbia University writes:

> Ever since Lewis Terman initiated his talent hunt in the early 1920's, relying heavily on the I.Q. to separate the "haves" and the "have-nots," psychometricians and educators have engaged in what seems to be a relentless search for a better test. As praiseworthy as such or any efforts at improvement may be, they are often exerted on a shaky premise. The assumption is frequently made that it is possible to assess potential that has never been nurtured. But is it really possible? Can we ever hope to identify the makings of a champion dart thrower among children who have never thrown darts or the great future playwright among children who have never written plays, or the budding gourmet cook among children who have never been close to a stove except to taste or sniff food that others were preparing? What is missing in most identification procedures is the use of classroom experiences as means of locating those with potential for excellence. Of course, the classroom experiences have to be designed imaginatively in order to bring results. In the hands of creative teachers, program enrichment is the surest fire way of determining who will perform well in an enriched program.

A challenge is embedded in the very nature of what we're actually observing. Simply put, there are no paper and pencil "tests" that will give us a true or definitive picture of our students' intelligence profiles. Instead, we are asked to observe the ways in which students' multiple intelligences are engaged in various activities, and consider the expressions of their multiple intelligences in the products they create. These observations can occur while students are learning basic skills or acquiring complex knowledge. Observations can also occur in the context of exposing students to MI rich activities. We use the phrase "MI-rich activity" to refer to an activity specifically designed to engage students' multiple intelligences in the process of exploring, manipulating, experimenting, gaining skills, creating, and/or constructing knowledge. In this context both students and teachers see what piques students' interests.

Another challenge to acknowledge and understand is that students' strengths emerge and develop over time within a variety of contexts. For this reason we need to avoid premature conclusions about students' strengths. Indeed, giving students access to suitable activities and time to engage across different intelligences is not only an important goal in and of itself, but fundamental to true and fair assessment.

We want to avoid using MI theory as another way to label or pigeonhole students. As you saw from the MI graph and the simulation, it is how individuals engage in a particular activity that reveals information about their intelligence profiles and strengths. For example, a student might be interested in and very good at acting, which calls for strong intrapersonal and bodily kinesthetic intelligences. This same student may make very poor personal decisions and be a mediocre athlete. Intelligence profiles are complicated by the fact that they are very often domain specific, with certain strengths appearing only within particular domains and activities. It requires observation and reflection to gain real insights about students' particular intelligence profiles.

Unfortunately, many students have had little exposure to a broad range of disciplines, which

might pique their interests and stimulate their intelligences. The question arises: How do we bring a rich array of opportunities for real-world creativity and problem-solving into our classrooms? This is difficult to do when we're expected to achieve curricular goals, typically based on materials that heavily favor logical-mathematical and linguistic intelligences. When will we have time and resources to offer alternative entry points and experiences?

As you already know and as you will see from our video examples, it does take time, resources, and continuing efforts to provide MI-rich learning opportunities and observe and reflect on students' unique strengths. We can't answer all of these challenges in the next few hours. However, we hope this module and the others that follow will provide useful guidelines, ideas and resources to get you started or to support your ongoing efforts. There are many ways to provide MI-rich activities and observe and recognize students' strengths. In this module we will consider:

- Activity and Learning Centers, where observing students from an MI perspective occurs as they learn basic skills
- Whole class activities
- Exploratoriums and Interest Development Centers

We will use the phrase "MI perspective" in referring to the ways in which students' multiple intelligences are engaged in various activities, and the evidence of their multiple intelligences in the products they create.

THE TEACHER'S ROLE IN OBSERVING AND RECOGNIZING STUDENTS' MULTIPLE INTELLIGENCES

ACTIVITY

SUGGESTED TIME: 5–10 MINUTES

You'll be asked to observe students on videotape and observe what other teachers do to learn about their students' intelligence profiles. Before viewing the tape, consider and discuss what it means for teachers to observe their students' intelligences, in a variety of contexts, over time. You might launch this discussion using any one or more of the following questions:

- Have you, in a formal or informal way, made an effort to observe your students' multiple intelligences? in a variety of contexts?) (over time?) Do you feel you've been successful in your attempts to do this? Why or why not?
- Describe what you think might be particularly good contexts for observing students for strengths. Are there activities within your curriculum that encourage observations of the six intelligences other than linguistic and logical-mathematical?
- In what ways do you or might you document your observations of students' intelligence profiles?
- What information do you look for in determining whether a student demonstrates an area of strength? Would you add additional criteria to the list below?

  What attracts students' interests?

Does student

- Follow directions independently?
- Demonstrate ease?
- Do superior work?
- Assume leadership roles?
- Ask for more time and more challenges?
- Add interesting details?
- Ask questions?
- Add creative suggestions?

As you proceed with the first video segment, remember that many teachers find it helpful to view a video segment more than once before discussing their observations.

VIDEO GUIDE

SEGMENT 1: ELIZABETH GONZALEZ'S 1ST-GRADE COOKING CENTER

BACKGROUND

Ms. Gonzalez's Activity and Learning Centers are used daily to teach and reinforce basic skills of reading, writing and mathematics. There are Centers for Science, Writing, Math, Computer, Blocks, Art, Cooking, and Reading Groups. A secondary goal for these Centers is for Ms. Gonzalez to assess her children's strengths through an MI lens. Having an array of media and resources available at each Center helps Ms. Gonzalez address this goal.

WHAT TO EXPECT

Observing students from an MI perspective in Activity and Learning Centers

Who: 1st-grade bilingual class led by Ms. Gonzalez

What: Observe children learning basic skills in classroom Activity and Learning Centers

Where: P.S. 42, District 9

WHAT TO FOCUS ON

- Observing how children engage in a task as evidence of their profiles of intelligences
- How to create MI-rich activities
- Different approaches to documenting observations and noticing patterns over time

The children in this Center are making muffins. As you watch, notice how they engage in this task. Specifically, observe how they use their linguistic, logical-mathematical, bodily kinesthetic, and interpersonal and intrapersonal intelligences.

PLAY TAPE

PAUSE TAPE FOR DISCUSSION

SUGGESTED TIME: 5 MINUTES

DISCUSS YOUR OBSERVATIONS

NOTE YOUR OBSERVATIONS

SEGMENT 2: UNPACKING THE TEACHER'S ROLE

WHAT TO EXPECT

In this example Ms. Gonzalez speaks about Ana's and Robert's process and products from an MI perspective. You might want to consider other perspectives, such as developmental reading levels.

Who:	Ms. Gonzalez's 1st-grade bilingual class
What, Where, Etc.:	Ms. Gonzalez's observations

WHAT TO FOCUS ON

Ms. Gonzalez comments on three phases of her role:

- Her observation and record-keeping strategies
- Designing MI-rich Learning and Activity Centers
- What she observes about two students' (Ana and Robert) profiles, based on their choices, behaviors, and products

PLAY TAPE

PAUSE TAPE FOR DISCUSSION

SUGGESTED TIME: 5–10 MINUTES

1. Do you have Learning and Activity Centers in your classroom? How do Learning and Activity Centers support the development of students' multiple intelligences? What other effective classroom strategies offer MI-rich activities to teach basic skills and/or help students learn?
2. Comment or expand on the observation and record keeping strategies in this example. [See Observation Sheets in Units, Lessons, and Tools.] Could you adapt them to your own use? Why or why not? Can you suggest other observation strategies that would work better for your classroom?
3. Do you have students who show a strength and preference for drawing over writing? In what contexts do these preferences emerge? How do you use this information?

NOTES

SEGMENT 3: MI EXPERT OBSERVATION

Who: Mr. Wali

What: Describes how MI experts analyze differences in the work of Ana and Robert

WHAT TO FOCUS ON

Mr. Wali provides an MI expert's analysis of the products produced by Robert and Ana, in terms of what they suggest about each student's intelligence profiles.

PLAY TAPE

PAUSE TAPE FOR DISCUSSION

SUGGESTED TIME: 5 MINUTES

DISCUSSION QUESTIONS

- Assessing spatial ability is important because many children have strengths in this area that go untapped. What did you learn from this analysis about what you might observe in demonstrations of spatial intelligence.
- We observe strength when the quality of work demonstrates above-average ability, creativity, and commitment to task. Think about your own students' work. Make a mental note of those whom you think might have strength in the spatial realm. You might want to share examples of their work at the next session and spend a few moments jointly analyzing these products on the basis of these criteria (above-average ability, creativity, and commitment to task).

NOTES

SEGMENT 4: MARY PREE'S CLASS

BACKGROUND

Ms. Pree has in-depth knowledge about MI. She has years of classroom experience teaching children at several K-5 grade levels. We videotaped her working with a small group of students who need extra assistance in developing their literacy skills. Today, Ms. Pree's activity is based on building. She invited her students to select their own projects and materials. Some students chose Kapla™ blocks, others chose Legos™, and still others chose to construct geodesic domes with toothpicks and marshmallows. (See Units, Lessons, and Tools for lesson on building geodesic domes.)

WHAT TO EXPECT

Who: Mary Pree, literacy teacher

What: Observe students from an MI perspective in a whole-class activity, in context of two curricular goals: 1) Speaking and Listening; 2) Writing (Narrative Procedures or Narrative Accounts) for NYC English Language Arts Performance Standards

Where: The Island School, District 1

Why: To consider this episode in Ms. Pree's class in terms of offering students MI-rich experiences and conducting related observations

WHAT TO FOCUS ON

This segment allows you to view students and share their teacher's own insights. We illustrate two important considerations in applying MI theory:

- The value of purposefully observing students, over a period of time, in various contexts, as a way to gain understanding of their strengths
- The sometimes surprising ways students bring their own unique intelligence profiles to bear on a given task

PLAY TAPE

PAUSE TAPE AND DISCUSS OBSERVING STUDENTS IN DIFFERENT CONTEXTS

SUGGESTED TIME: 5 MINUTES

Ms. Pree shares insights regarding José, in particular the fact that she has observed him over time in a variety of contexts. What do her insights suggest about observing students through an MI lens over some period of time?

SEGMENT 5: OBSERVING JULIO'S STRENGTHS

WHAT TO EXPECT

Who: Mary Pree and Julio

What: Observe Julio's approach to a building activity

PLAY TAPE
PAUSE TAPE

Discuss significance of Julio's approach to building.

SUGGESTED TIME: 5 MINUTES

What is significant about Julio as a learner in this context? What might be significant about a student who has a strong need to be a storyteller?

NOTES

SEGMENT 6: MS. PREE ON FREE EXPLORATION

WHAT TO EXPECT

Who: Mary Pree

What: Same context as above

PLAY TAPE
PAUSE TAPE

DISCUSSION

SUGGESTED TIME: 5 MINUTES

Based on Ms. Pree's comments and your own observations of her interactions with students, discuss your reaction to her comments about free explorations. Does free exploration necessarily preclude a focus on curricular goals?

YOUR NOTES

SEGMENT 7: MI INSTITUTE EXPLORATORIUM

BACKGROUND

Howard Gardner (1991) views museums, especially those with interactive exhibits, as one of the finest forms of education. He observes that museums

- allow students to construct understandings in authentic ways
- provide an opportunity to explore and deepen understanding of key concepts
- offer students a chance to "unlearn" their long-held naive assumptions

Museums also allow students to use their multiple intelligences. To recreate some of the qualities of a museum, educators with an interest in multiple intelligences theory have come up with a learning environment they refer to as an Exploratorium.

Exploratoriums are interactive installations—like those illustrated in this segment. These types of installations have been replicated in school libraries, hallways, or even in corners of cafeterias.

Teachers create their own Exploratoriums in classrooms. Known as Interest Development Centers, these installations are available to students both for free explorations and for working on curricular goals. Topics might include Photography, Herpetology (with small specimens), Investigative Journalism, the Oceans, the History of Aviation or Telecommunications, the Fashion Industry, or Folk Music, to name just a few. In determining topics, teachers consider issues such as space, time, students' skills, students' knowledge and ability, and available resources.

The main purpose of these installations is to offer students an opportunity for risk-free, judgement-free engagement. Exploratoriums and Interest Development Centers serve as an excellent way for teachers to observe and students to express their multiple intelligences. Teachers take time to notice *who* becomes engaged in *which* Centers as well as *how* individual students engage in the various activities.

WHAT TO EXPECT

Who: NYC teachers

What: Observe teachers engaged in a variety of MI-rich activities

Where: Teacher's MI Institute

Why:
- To sample activities that offer opportunities to explore multiple intelligences
- To explore the role the classroom teacher plays in engaging students in these activities
- To consider the nature and importance of risk-free, judgement-free choices in explorations activities

CENTERS IN THIS EXAMPLE

Photography Center
Historical Research Center
Engineering Center
Eco Center

PLAY TAPE
PAUSE TAPE

DISCUSSION

SUGGESTED TIME: 5 MINUTES

DISCUSSION QUESTIONS

- What were your initial reactions to this video segment? What struck you as particularly interesting (or challenging) about this segment?
- From what you've seen, which center would you as a student have chosen – photography, historical research, engineering, or the eco center? Why?
- Can you think of ways to add a musical experience within the context of an Exploratorium installation or Interest Development Center? [See suggestions for Interest Development Centers in Units, Lessons, and Tools]

Provide opportunities for students to reflect on what they enjoy. In applying MI theory, it's important to give students an opportunity to discuss and record their preferences to encourage them to experience risk-free activities even in areas where they lack confidence. A journal entry, evaluation form, or some type of graphic expression are all effective ways for students to make and keep records of what they like to do and what they are learning about themselves.

Exploratorium or Interest Development Center experiences encourage students to reflect on what they enjoy and why they enjoy it. This, in turn, gives them insight into how they best learn.

NOTES

SEGMENT 8: APPLYING YOUR UNDERSTANDING IN ANALYZING STUDENTS' STRENGTHS

WHAT TO EXPECT

Reflect on and discuss your students' strengths.

SUGGESTED TIME: 10–15 MINUTES

In this activity you'll be asked to think about your students from an MI perspective.

1. Think about two of your students whose strengths are not primarily in linguistic or logical-mathematical intelligences. Read the following questions and try to recall situations in which you observed such behaviors in connection with these two students. Note the activities or situations in the space provided.

2. Discuss your reflections with your colleagues.

	Student A	Student B
Follows directions independently? Activity?		
Demonstrates ease? Does superior work? Activity?		
Assumes leadership roles? Activity?		
Asks for more time and challenges? Activity?		
Adds interesting details? Activity:		
Asks questions? Activity:		
Adds creative suggestions? Activity:		
Others?		
Which intelligences were primarily engaged?		

3. Did you learn something new or get a stronger sense of your students from reflecting on their behavior in this way? In what sense?

SEGMENT 9: SUMMARY OF MODULE II

WHAT TO EXPECT

Who: Mr. Wali

Why: Review key points

PLAY TAPE

END TAPE: REVIEW KEY POINTS

SUGGESTED TIME: 2 MINUTES

Key points of Module II:

- The teacher's role is important in helping to assure that students have opportunities to explore and express their multiple intelligences
- It's important to encourage students to explore their multiple intelligences in a nonjudgmental climate
- Remember, avoid mere "snapshot" assessments. Intelligences will be expressed in different contexts, over a period of time.

Observing students' multiple intelligences is ongoing. As you'll see in the following modules, you will continue to observe multiple intelligences to build on students' strengths to achieve curricular goals. There are a number of activities and instruments in Units, Lessons, and Tools to help you and your students explore expressions of multiple intelligences. On the following pages there are suggested interim activities to try out and discuss with your team, starting with small efforts and progressing to more ambitious ones. These activities will help you to deepen your understanding of the process of observing and recognizing students' multiple intelligences.

INTERIM ACTIVITIES

Choose one or more of the following activities to observe students as they explore their profiles of intelligences. Take small, thoughtful steps, rather than sign up for a triathlon.

ACTIVITY 1

Analyze your own classroom environment using the Reflection Guidelines to Assess MI in Your Classroom in Units, Lessons, and Tools. Share with a colleague or small group how you analyzed and what you found. If your team so desires, you might want to start this activity by creating your own process and worksheet for reflecting on your classroom and schoolwide offerings.

ACTIVITY 2

Consider small steps within the context of your classroom goals, units, etc., to include a "neglected" intelligence area. For example, if you do little or nothing to give your students an opportunity to explore their spatial or bodily kinesthetic intelligences in your class, consider what you might offer to make that possible. Get help from your teammates regarding ways you can explore intelligences that are not in your own area of competence. See Units, Lessons, and Tools for some ideas.

ACTIVITY 3

Older elementary students are developmentally capable of understanding MI theory. Acquaint them with the theory and have them participate in judgement-free, risk-free explorations with full knowledge that the purpose is to learn more about their unique interests and strengths. They will be able to learn about the basics of MI theory by watching the videotape "The Intelligences" from Module I.

You might ask them to help you customize the Personal MI Graph for their class, and then ask them to take responsibility for surveying their classmates' interests and strengths and for summarizing the findings.

ACTIVITY 4

Take time between two team meetings to observe your students during one activity of your choice. You may try one or more of the observations checklists available commercially. Also, see the Observation Notes: Individual Students, and Whole Class Observation Sheet in Units, Lessons, and Tools.

You will also find additional activities in the Units, Lessons, and Tools section for exploring strengths, for small or large groups or the whole class, including:

1. Building the Geodesic Dome
   —primarily spatial and bodily kinesthetic
2. Storyboarding
   —primarily spatial and personal
3. To Float or Not to Float
   —primarily logical-mathematical
4. Gift Giving and Pop Quiz and Character Interviews
   —primarily personal and bodily kinesthetic

ACTIVITY 5

Observe one or two students across several activities and contexts. Gather several observation notes and consider this student in terms of an emerging profile of intelligences. Try to look in many places, not just academics. For example, observe the students in purely social situations if possible. At your next meeting discuss your observations.

UNITS, LESSONS, AND TOOLS

REFLECTION GUIDELINES FOR ASSESSING MI IN YOUR CLASSROOM

(Baum, et. al, in press)

1. *How are my students engaged?*

• Consider the domains provided and lessons and activities offered in your classroom over a month.

2. *What domains and intelligences are substantively encompassed in class activities?*

- Be specific and clear about what activities are linked to which domains or intelligences. Be sure the activities are substantive and meaningful. For example, listening to music does not necessarily engage musical intelligence. Writing a song should.
- Make your list. Remember this is an ongoing process, so document this information in a way

Domains:	**Intelligences:** (including combinations)

that will allow easy subsequent access.

3. *What are some identifiable domain/intelligence gaps?*

- What domains are valued in the real world and are appropriate and meaningful for this classroom? Which intelligence areas are not fairly represented in my classroom?
- Are there intelligence areas that you avoid? Think about areas you consider your areas of weakness. Are they absent, or nearly so, from the classroom?
- Think about specific students, especially those you feel you haven't reached or have generally proven hard to reach. Might this be an issue of making the classroom more inclusive of areas in which these students are comfortable and/or skilled? What might those areas be?

4. *How will I enhance or what will I add to my curriculum/instruction/materials?*

- Review your responses above.
- Prioritize the domains, intelligences, and/or activities that you want to add to the classroom. Which ones do you see as essential and should be added first?
- What sorts of experiences do you want to include in the near future?
- Are there experiences you can integrate into extant projects or units?
- Create a tentative and flexible plan for integrating experiences you have identified as priorities.

Domains:	**Intelligences:** (list combinations)

INDIVIDUAL STUDENT OBSERVATION FORM

The Individual Student Observation Form can be used for record keeping as you observe individual students. You might use the form to note behaviors of six different students during one whole class activity, or use the same form to observe up to six students engaged in different activities over time. Identify the activity and date, and note student's name. Refer to the behaviors listed on the left, which suggest strengths, or note other behaviors that you think might also indicate a strength.

Activity/Date:	**Name:**	**Name:**
Follows directions independently.		
Demonstrates ease.		
Does superior work.		
Assumes leadership roles.		
Asks for more time and challenges.		
Adds interesting details.		
Asks questions.		
Adds creative suggestions.		
Others?		

Activity/Date:	**Name:**	**Name:**
Follows directions independently.		
Demonstrates ease.		
Does superior work.		
Assumes leadership roles.		
Asks for more time and challenges.		
Adds interesting details.		
Asks questions.		
Adds creative suggestions.		
Others?		

Activity/Date:	Name:	Name:
Follows directions independently.		
Demonstrates ease.		
Does superior work.		
Assumes leadership roles.		
Asks for more time and challenges.		
Adds interesting details.		
Asks questions.		
Adds creative suggestions.		
Others?		

The Individual Student Observation Form will be helpful when you reflect on an individual student's behaviors. To avoid premature "snapshot" conclusions, answer these questions after observing a student for several weeks.

OBSERVATION NOTES: INDIVIDUAL STUDENT

(adapted from Krechevsky and Seidel, 1998, permission pending)

Date

Student

What choices does student make when given options? What domains or activities does she prefer?

Roles taken when working with others to complete a task:

How does she handle unanticipated problems?

How does she approach problem solving?

What captures student's attention?

Under what conditions or in what contexts does she sustain interest? When does it falter?

Name problem-solving strategies student appears to use.

List ways student communicates ideas, understandings, thoughts, and feelings to others. Look for patterns. Note physical actions, as well as speech.

When does student demonstrate high quality of product/performance?

What are your hunches about this student's apparent MI strengths?

WHOLE CLASS OBSERVATION SHEET

Activity _____ Date_____ Class_____

Check columns to note strengths.

Student	Linguistic	Log.-Math.	Spatial	Musical	Naturalist	Interpers.	Intrapers.	B-K

BUILDING THE GEODESIC DOME
(Baum and Herbert, 1994)

Many teachers have reported anecdotally that students who are particularly disenchanted with books, writing and math are often "transformed" by this building opportunity. Teachers also report that some students who are particularly adept at building domes show excellent interpersonal skills in connection with classmates who are having difficulties. This suggests that we should keep our observations open-ended as no intelligences can be isolated nor can activities be definitively labeled as requiring only one or another intelligence.

This activity makes an excellent entry point for math activities, as well as the study of habitats and architecture, not to mention the contributions of Buckminster Fuller.

BEHAVIORS TO LOOK FOR IN STUDENTS

- Can follow direction sheet independently
- Demonstrates ease working with building materials
- Assumes leadership roles by helping others build their domes
- Asks to build other structures
- Adds details to the basic dome structure
- Generates many uses for the dome

MATERIALS

•Several copies of directions, "How to Construct a Geodesic Dome"

•26 mini marshmallows (plus 5 or 6 for eating) for each student

(Dry out the marshmallows by letting them sit out overnight before activity.)

•60 toothpicks for each student

• Age-appropriate information about geodesic domes, i.e, works by Buckminster Fuller about domes, photos, etc.

MOTIVATION

Tell students they will have a chance to build a particular type of dome, and give some background on why these domes are unique: because they are structures made strictly out of triangles. Tell them they can learn more about the uses of these domes after they've completed their structures.

Jump to page 27 for instructions.

STORYBOARDING

(Baum and Herbert, 1994)

Storyboarding is a strategy students can use to help them remember ideas and communicate them in a logical manner. This strategy can assist students with organizing ideas, seeing a "picture" of a situation, remembering a sequence of events, and recording their ideas. It also helps in allowing students to elaborate on the focus of their ideas.

Storyboarding is used by film and video makers to plan their film sequences. Students, too, can use this technique to make movies, photo essays, slide shows, or animation. These are highly motivating products for many students. They offer opportunities for critical and creative thinking as well as a chance to act like a practicing professional. Having a real-world goal not only motivates students; it encourages them to do their best.

Many teachers have reported anecdotally that students who are particularly disenchanted with books, writing, and math are often transformed by this opportunity.

MOTIVATION

Pictures, as we know, can tell stories. This is an activity that will give you a chance to tell a story with pictures. You can put as much detail into your pictures as you want, showing us what is happening in your story.

In this activity we're going to use a method that is used sometimes by professionals who make films or commercials for television. It's called a storyboard.

Remind students of a familiar special effects sequence as an example that was first plotted out as a storyboard.

DISCUSS SHOTS

- **Wide Shot:** Establishes Scene

We see the larger setting in which the scene takes place. If possible, show a sample of a wide shot. You may use photo to do so.

- Three shot or two shot: Two or three people interacting in a scene

Show two or three shot in a photo from the same scene as prior photo.

- **Medium Shot:** Focuses on details of a person, from the waist up

Show medium shot in a photo from the same scene as prior photo.

- **Medium Closeup:** Whole Face, focus on one subject

Show medium close up from the same scene as prior photo.

- **Closeup or Extreme Closeup:** Fill the screen with a feature, like eyes or mouth

Show closeup or extreme closeup from the same scene as prior photo.

Have students practice shots by using their balled fist to frame different shots. They can also crouch down and look up to understand low angles and stand up and look down to understand high angles.

A practice storyboard for Humpty Dumpty follows. For older students, Humpty Dumpty quickly may become a metaphor. Tell them to feel free to use the fate of Humpty Dumpty to express their own ideas.

STEPS

1. Fold a piece of 8 x 11 paper in sixths.

2. Have the students recall the nursery rhyme "Humpty Dumpty."

3. Start the first frame by having students brainstorm on where they want the story to take place, and during what season and time of day. Have them decide what the wall will be made of and for the older children, what kind of shot they want for the scene.

   Frame 1. A long shot is preferable so the viewer can get a sense of the whole scene. Have them draw frame 1 incorporating the details they have chosen.

4. Pick a few samples and read back frame 1 according to the details the students drew in. For instance, one student drew the Great Wall of China and Humpty wearing a Chinese hat. The teacher read the picture: "It was a bright sunny day in China with no clouds in sight...Humpty was perched on the Great Wall, etc." It is important for the teacher to model good language and descriptive vocabulary.

5. **Frame 2.** This time the scene should focus on Humpty and how he or she is feeling. Have a student be Humpty and have other students interview Humpty for the facts, etc. At this time older children should discuss the kind of shot necessary to focus in on Humpty. Have students draw their scene and again "read" back some examples.

6. Continue in the same manner for the rest of the frames, using the following suggestions:

   Frame 3: The Fall

   Frame 4: The Rescue Mission (All the King's Horses, etc.) Understand that some students will create rescue teams based on their scenario. This frame may extend the story to where Humpty fell, such as, "into a dark black hole." The rescue may not come until later.

   Frames 5 & 6: Students complete the story on their own. For example, the student who created Humpty with the Chinese hat had him fall upside down into the pointed hat thus making it an egg holder. Another student had the story take place by the seashore. When Humpty fell, he landed underwater. He was just about to be eaten by Charlie the Tuna, when Charlie remembered he was on a low-cholesterol diet. Humpty floated to the top and was rescued.

7. When the storyboard is finished, plan how the movie will be made. A simple idea is to use transparencies for each frame or divide one into sixths. Show one frame at a time with a student or teacher providing narration.

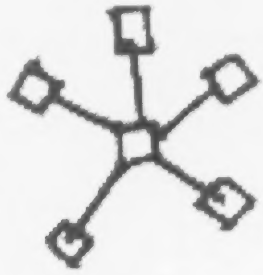
8. Then write the narrative. Each frame is to be developed into a scene. Have the students create the script or story, one frame at a time. Do one frame a day to assure that each frame has a well-written descriptive narration.

HOW TO CONSTRUCT A GEODESIC DOME

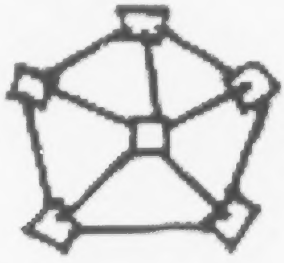
(Baum and Herbert, 1994, drawn by S. Kaplan)

1. Take 1 marshmallow and 5 toothpicks.

2. Put marshmallow on end of each toothpick.

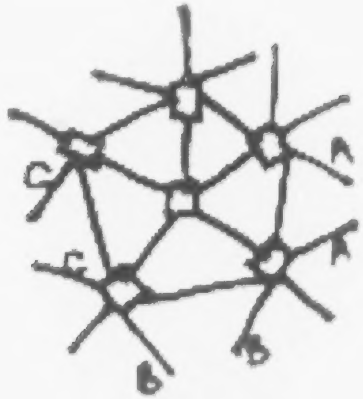


3. Connect each marshmallow with toothpicks.

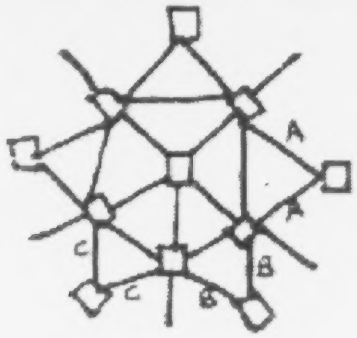


Result:
pentagon

4. Add 3 toothpicks to each marshmallow.



5. Join the toothpicks, attaching neighboring picks with one marshmallow.

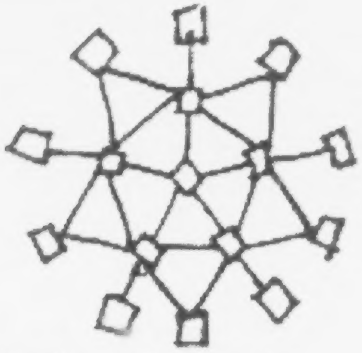


Attach:
A with A,
B with B, etc.

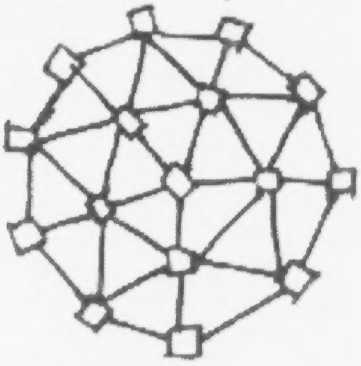
Result:

5-pointed star

6. Put marshmallow on single toothpick.



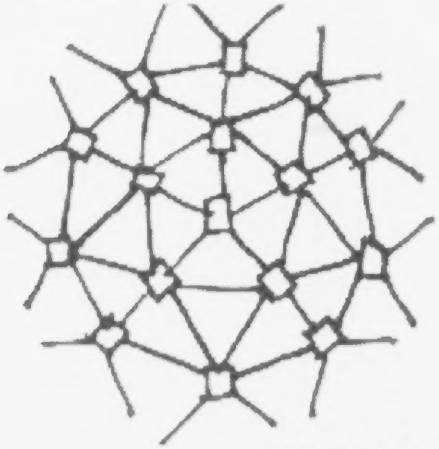
7. Connect all marshmallows with toothpicks.



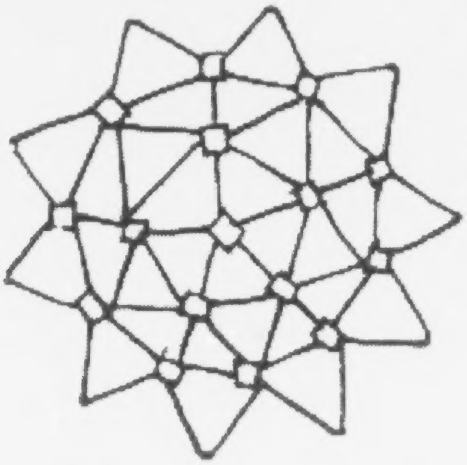
Result:

decagon

8. Add 2 toothpicks to each marshmallow.

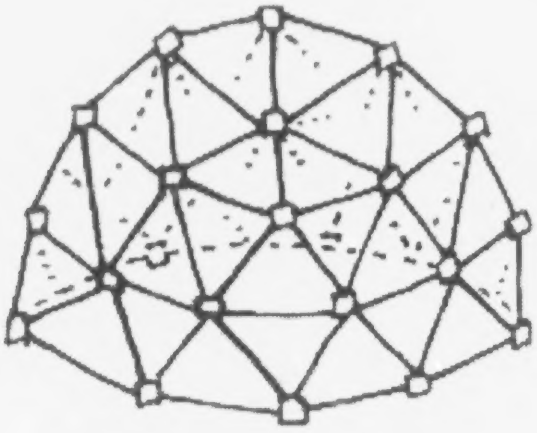


9. Connect toothpicks so neighboring picks "hold hands."



Result:
10-pointed star

10. Connect all marshmallows with toothpicks to form a geodesic dome. It is at this point that the dome takes shape. Up until now, it was basically flat.



Result:
Geodesic dome

TO FLOAT OR NOT TO FLOAT

(Baum and Herbert, 1994)

This activity provides an excellent entry point for teaching about the properties of liquids, gases, etc. Use the opportunity to observe the students and see who really seems to enjoy the activity. Use the observation sheet to guide your observations.

BEHAVIORS TO LOOK FOR IN STUDENTS

In this activity you should identify students who are strong in logical-mathematical intelligence, as they draw conclusions about what they observe, develop hypotheses and a plan to logically test their hypotheses.

Behaviors to watch for:

- making careful observations
- generating many questions about what they observe
- asking "what if" questions (demonstrating that the student is engaging in problem finding or solving)
- inventing their own hypotheses and developing their own experiments to test them, including how to control for alternate hypotheses
- drawing conclusions about their observations and developing their own theories
- returning to the activity or an extension or elaboration of the activity over time to continue their own inquiry
- recording data or observations systematically with pictures, numbers, or words

MATERIALS

Raisins, clear plastic cups, cans of 7-Up at room temperature, water, a lab notebook, proposal forms

PROCESS

1. Divide the participants into science teams of three or four. Give each team half a cup of water, half a cup of 7-Up, and about six to ten raisins.
2. Instruct the participants to place a few raisins in each cup and observe what happens.
3. Discuss observations, and then have participants generate any and all possible questions about their observations. (Ex: The raisins will dance up and down in the 7-Up, but sink in the water.)
4. Ask the participants to decide on questions that can be answered by designing their own experiment.
5. Have participants fill out a proposal form for future experiments.

SAMPLE PROPOSAL FORM

My proposal

My problem: I wonder if other things will bob up and down in the 7-Up?

My hunch: I think other things that are wrinkled and sugary will bob.

What I will need: Cups, 7-Up, grapes, prunes, rice, dried fruits, gum, spaghetti

What I will do: Drop each in 7-Up and observe what happens. Look for patterns and observe what sinks, floats, or bobs up and down.

Teachers need to help the students find the materials, and provide space and time to conduct the experiment and share their findings.

WRAPUP

Lead a brief discussion:

- What did they like about this activity? What didn't they like?
- Did they learn something about themselves in this activity?

Depending on age group, add resources for students to gain additional information about the properties of liquids, gases, etc.

IMPROVISATION EXERCISES

(Activities adapted from Freestyle Repertory Company)

These improvisation activities make excellent entry points for a variety of Speaking, Listening, and Writing requirements in the NYC Language Arts Performance Standards.

Use the opportunity to observe the students and see who really seems to enjoy improvisation, for example, who pays attention to the process? Use the observation sheet to guide your observations. As you conduct these activities, look for evidence of strength or interest in performing arts as students:

- Pay attention, by listening and observing the rules of the game.
- Cooperate, by concentrating on their partner's "offerings" or "questions" so that they can respond appropriately.
- Take risks – This is possible if you provide a forum in which students are asked to be spontaneous and nonjudgmental.
- Demonstrate initiative.

CONTEXT

This activity requires no previous experience with improvisation.

MATERIALS

None

SPACE

Arrange an open space in your classroom so that students will be able to work in pairs, standing up, and be able to have a bit of space for pantomimed movements.

PROCESS

Warmup

Explain key points of improvisation:

In improvisation, actors play the roles of writer, director, and actor, all at one time. There are only two rules:

Rule 1. ALWAYS say "yes," which means go along with your partner's idea whenever possible, and go along with your own idea as well!

Rule 2. ALWAYS make your partner look good, which means try to be positive in all of your responses to your partner.

GIFT GIVING

MOTIVATION

Today you can pretend to give and get almost any gift you could ever imagine. What's even better, the only person who really knows what gift you're being given is you! It may sound a little silly, but the idea is to use your imagination and have some fun!

PROCESS

Model gift giving with a student volunteer for the class. Model both a blind offer (a large bundle that could be a bag of groceries or a bag of toys) and a specific offer (a necklace or a small ball). You might want to rehearse this demonstration prior to the class so you and the student can give a clear demonstration.

Make sure students are aware of the following key points:

1. Actor A pantomimes giving a gift to Actor B.
2. Actor B pantomimes accepting the gift, says what the gift is, then says "thank you."
3. For example: "Wow, a bowling ball! Thank you!"
4. The actor accepting the gift says what the gift is based on the physical gestures indicating the weight, shape, and origin of the gift.
5. Actor B then repeats the process by pantomiming giving a gift to actor A.

There are two types of physically pantomimed offers the giver can make:

- Blind Offer: This type of offer is not obvious to the person receiving – it is left open for interpretation. For example, the giver can use both hands to pass along the gift indicating that the gift is large and/or heavy. The receiver then decides what exactly the gift is – a log, sack of potatoes, rock, etc.
- Specific Offer: This type of offer is more specific, leaving less room for interpretation. For example, if the gift giver pantomimes removing something from his/her feet and hands it to the receiver, it would be logical to guess that the gift is a shoe or some type of footwear. If the receiver responds by saying "Thank you for the ring" then he or she has "blocked" the offer.

Ask students to "exchange imaginary gifts" for about five minutes.

WRAPUP

Lead a brief discussion:

- What did they like about this activity? What didn't they like?
- Would they like to do more improvisation?
- Did they learn something about themselves in this activity?

POP QUIZ

For this improvisation exercise, students may stay seated, preferably in a circular arrangement. The facilitator's job is to ask students questions beginning with: WHO, WHAT, WHEN, WHERE, and WHY. The key to the exercise is that all answers are correct, no matter how ridiculous! The only exception is "I don't know."

MOTIVATION

Today you are experts in absolutely everything! You have the answers to any questions I can think of, and every answer you give is 100 percent right! The only wrong answer is 'I don't know.' Let's start with this: Who is the oldest living man in North America? What year was he born? How many children did he have?

PROCESS

1. Start off with something like "I found this secret message hidden in my shoe this morning. Since you're an expert on decoding hidden messages, please tell me what it says."

2. It is not necessary to prepare your questions ahead of time. Instead, listen carefully to the students' responses and use them as a segue to the next question. For instance: "What is the name of the queen of chickens?" "Helen." "Right. What does Helen wear on her head?" "A feather hat." "Good. What color is the feather hat?" "Blue." "Exactly. What else does Helen own that is blue?" "A car." "Here's a piece of the blue car – smell it. What does it smell like?"

- Since any response is correct, it is best not to ask yes/no questions.
- Be sure to direct each question to different students.
- If you're concerned you won't be able to come up with questions spontaneously, plan a list in advance of twenty nouns which form the basis of your questions.

WRAPUP

Lead a brief discussion:

- What did they like about this activity. What didn't they like?
- Would they like to do more improvisation?
- Did they learn something about themselves in this activity?

CHARACTER INTERVIEWS

This improvisation is illustrated by professional actors in Module III. In Module III it serves as an entry point for creating complex characters as an element of narrative writing. The character interview can also be adapted to lessons in response to literature in order to deepen understanding of characters in literature.

WHAT THIS LESSON WILL ACCOMPLISH FROM AN MI PERSPECTIVE

This lesson uses the personal and bodily kinesthetic intelligences as entry points to help students invent characters and think about the dimensions that make up complex characters, in preparation for writing narrative accounts. The personal and bodily kinesthetic intelligences predominate because players are acting out parts, rather than simply questioning and describing the attitudes and interests of their characters.

MOTIVATION

This is a chance to give your imagination a workout. There can be no wrong answers. In this activity you'll see how perceptive you can be about why people think and act the way they do.

PROCESS

Before you ask students to conduct character interviews among themselves, you may want to model the activity with a student volunteer. You should take the role of the character and if necessary rehearse with the volunteer before the class. After this demonstration the students will take their turns, following these directions:

1. Pair off. Decide who will be Interviewer and who will be Interviewee

2. Each character to be interviewed is given:
- a name,
- a job (it may be unusual)
- an attitude toward life

3. To start off, the interviewee appears to be doing something in connection with his job. The interviewer asks open-ended questions and goes along with the answers. Questions draw the character out and are usually around his likes and dislikes, family situation, work, etc. The goal is to offer as much detail as possible about the objective and subjective reality of the character, which in turn will generate good material for a writing exercise as well as insights into complex characters in literature.

4. Repeat the process, switching roles from interviewer to interviewee.

WRAPUP

When the activity is over, discuss the following questions:
- What did you like about this activity? Did you have a preference for the role of interviewer or the role of interviewee?
- What did you dislike?
- Did you learn something about yourself in this activity?

OVERVIEW OF INTEREST DEVELOPMENT CENTERS

(Baum, et. al., in press)

Interest Development Centers provide an excellent opportunity for students to explore their interests and experiment with activities across intelligences. They allow teachers a means to enrich the curriculum, as well as an opportunity to develop an understanding of their students' strengths and interests. This can be accomplished by observing students while they engage in the activities and discussing their observations with their students.

The following suggestions can help you set up your own version of a "museum" installation, or "Exploratorium." A room in a building can be designated as a museum room; part of the library can be used. Or the specialists in a school can transform their rooms on occasion to allow for explorations, inviting students to dabble in a variety of music, art, or science activities where they will not be graded and they have free choice.

Another option is to provide a classroom corner for rotating Interest Development Centers. The key is to give students a chance to try out the activities, rather than require all students to satisfy curricular goals associated with the Centers. For more information about Interest Development Centers see Renzulli and Reese (1995).

YOUR TASK

With your colleagues...

- Brainstorm a list of Interest Development Centers based on what you know of your students' interests, and gather materials to create a few Centers.
- Ask students to complete at least one activity in at least two centers.
- Upon completion of each activity, ask them to reflect upon their experience by writing down their thoughts on the questionnaire on the next page.
- Ask students to use the Assessing the Interest Development Center [Exploratorium] Experience, or some other method, to "debrief" their activities.
- Be sure to set aside time to discuss your new insights about students' strengths with your colleagues after students have had an opportunity to engage in these free-exploration activities.

ASSESSING THE INTEREST DEVELOPMENT CENTER [EXPLORATORIUM] EXPERIENCE

(Baum, et. al, in press)

Students may answer these questions on their own, interview one another, or this may be the form you use to guide one-on-one discussions with them about their interests and strengths.

Please identify the centers and activities you selected.

1. _____

2. _____

Questions	Experience #1	Experience #2
1. What drew you to this center?		
2. Why did you choose the particular activity?		
3. Which of the intelligences do you think you used in completing the activity?		
4. Would you have liked to continue at this center longer? If so, what else would you have liked to try? What more do you want to know? What else would you have liked to see at this center?		
5. What did you learn about your strengths and interests from the experience?		

The Interest-A-Lyzer

by
Joseph S. Renzulli
University of Connecticut

Name _____ Age _____

School _____ Grade _____

Date _____

The purpose of this questionnaire is to help you become more familiar with some of your interests and potential interests. The questionnaire is not a test and there are no right or wrong answers. Your answers will be completely confidential. You may want to talk them over with your teacher or other students, but this choice is entirely up to you.

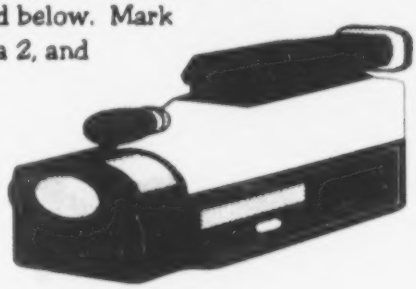
Some of the time that you spend on enrichment activities will be devoted to working on individual or small-group projects. We would like you to work on projects that are of interest to you, so it is necessary for you to do a little thinking to know what some of your interests might be.

A good way for you to get in touch with your interests is to think about some of the things you like to do now and also some of the things you might like to do if the given the opportunity. Some of the questions that follow will be "Imagine if..." questions, but keep in mind that their only purpose is to have you think about the choices you would make in an imaginary situation.

As you read the questions try not to think about the kinds of answers that your friends might write or how they might feel about your answers. Remember, no one will see your answers if you want to keep them confidential.

Do not try to answer the questions now. Read them over and think about them for a few days and then write your answers. Please do not discuss the questionnaire with others at this time. Sometimes we can be influenced by the opinions of others and this influence may prevent you from exploring some of your own interests. Remember, the purpose of The Interest -A-Lyzer is to get YOU to THINK about YOUR OWN INTERESTS.

1. Imagine that your class has decided to create its own Video Production Company. Each person has been asked to sign up for his or her first, second or third choice for one of the jobs listed below. Mark your first choice with a 1, second choice with a 2, and third choice with a 3.



_____ Actor/Actress

_____ Director

_____ Musician

_____ Business Manager

_____ Computer Effects Specialist

_____ Prop Person

_____ Advertising Agent

_____ Script Writer

_____ Costume Designer

_____ Scenery Designer

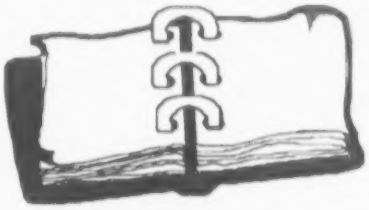
_____ Light/Sound Person

_____ Camera Operator

_____ Dancer

2. Imagine that you have become a famous author of a well-known book. What is the general subject of your book? Circle One.

Fine Arts	Business	Science
Writing	History	Social Action
Athletics	Mathematics	
Performing Arts	Technology	



What will it be about?

_____

_____

_____

_____

What would be a good title for your book?

_____

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3. Computers and telephone technology allow us to communicate with people all over the world. Imagine that your school has installed an Internet or telephone system that will allow you to communicate with anyone in the world. With whom would you correspond?

First Choice _____

Second Choice _____

Third Choice _____

4. Imagine that a time machine has been invented that will allow famous people from the past to travel through time. If you could invite some of these people to visit your class, who would you invite?

First Choice _____

Second Choice _____

Third Choice _____

5. Are you a collector? Do you collect stamps, coins, autographs, baseball cards, or other things? List the things that you collect and the number of years you have been collecting.

Things I Collect	Number of Years I Have Been Collecting
_____	_____
_____	_____
_____	_____
_____	_____

Imagine you have the time and the money to collect anything you wanted. What would you collect?

_____

_____

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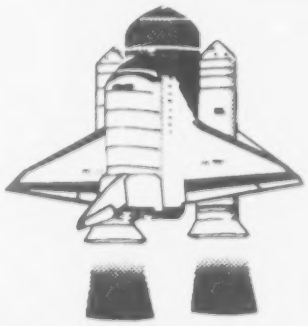
6. Imagine you have the opportunity to travel to a new and exciting city. You can select three places to visit. Mark your first, second and third choice by placing a 1, 2, and 3 in the spaces below.

_____ Art Gallery	_____ Science Center
_____ Professional Sport Training Camp	_____ Ballet or Modern Dance
_____ Historical Sites	_____ Musical Concert
_____ Stock Market	_____ State Senate Meeting
_____ Television Studio	_____ Computer Center
_____ Planetarium	_____ Court Room
_____ Telecommunications Center	_____ Zoo
_____ Symphony Orchestra	_____ Stage Play
_____ 3-Dimensional Multi-Media Film	_____ Newspaper Office

7. Imagine that you have been assigned to a space station for your next school year. You are allowed to take a few personal possessions (books, games, hobbies, projects) with you to help you spend your free time.
List the things you would take.

_____
_____
_____
_____
_____
_____



8. Imagine that you can spend a week "job shadowing" any person in your community to investigate a career you might like to have in the future.
List the occupations of the persons you would select.

First Choice _____

Second Choice _____

Third Choice _____

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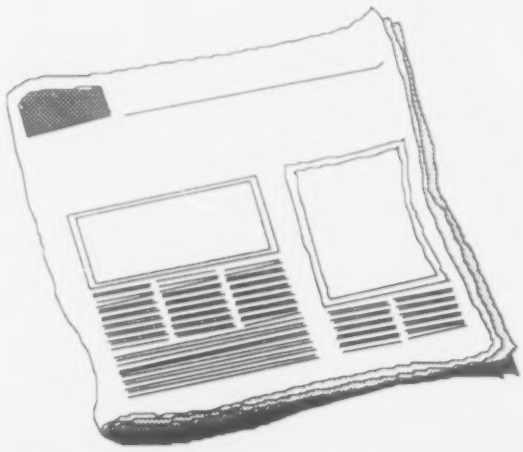
9. Newspapers often have special feature columns or sections such as the ones listed below. Imagine you have been given a job as a feature writer. Which of the following columns would you like to write? Mark your first, second, and third choice with a 1, 2, and 3.

_____ Movie Reviews	_____ Fashion Column
_____ Book Reviews	_____ Science Facts
_____ Political Cartoons	_____ Cross Word Puzzles
_____ Local History	_____ Camping
_____ Stock Market Analysis	_____ Music Critic
_____ Personal Advice	_____ Business Trends
_____ Video Game Reviews	_____ Humor
_____ Editorials	_____ Mathematics Puzzles
_____ Famous People	_____ Advice on Chess
_____ Cars and Bikes	_____ Sports Analyst
_____ Travel	_____ Pet Care
_____ Internet Connections	_____ Computer Column
_____ Social Action News	_____ Advice to Consumers



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10. Some schools offer extra-curricular activities and clubs that coincide with student interest areas. In fact, students sometimes don't know they have an interest in something until they get to try it out in a club or activity. Enrichment Clusters are another good place to find out about interest areas. Listed below are some examples of clubs, activities, and clusters.

Mark the ones that you have been involved in with an "X". Circle the ones you would like to try someday.

_____ Newspaper	_____ Language Club
_____ Yearbook	_____ Collections Club
_____ 4-H	_____ Ecology Club
_____ Girl or Boy Scouts	_____ Drama
_____ Cooking Club	_____ Invention Convention
_____ Math Club	_____ Science Club
_____ Chess	_____ Literary Magazine
_____ Babysitting Club	_____ Computer Club
_____ Math Olympiad	_____ Future Problem Solving
_____ Odyssey of the Mind	_____ Sports (List here): _____
	_____
	_____
	_____

Are there any we forgot? You can use space below to tell us which clubs, activities, or clusters you have participated in:

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11. Many people take part in activities that are not connected with school work or the extra-curricular activities organized by the school. Listed below are examples of such activities. Indicate how often you have participated in each activity by marking the appropriate column. Please do NOT check any activities that were part of your school work or were organized by the school which you attend.

	Never	Seldom	Sometimes	Often
1. Wrote a short story, play or poem.	___	___	___	___
2. Repaired a broken radio, toy, machine or piece of furniture.	___	___	___	___
3. Conducted a science experiment.	___	___	___	___
4. Programmed a computer.	___	___	___	___
5. Printed a newspaper.	___	___	___	___
6. Took photographs of landscapes, interesting people or unusual objects.	___	___	___	___
7. Studied the weather by keeping daily records of temperature, barometric pressure, rain fall etc.	___	___	___	___
8. Used the Internet to locate information.	___	___	___	___
9. Organized a team or club.	___	___	___	___
10. Organized a musical group.	___	___	___	___
11. Was a member of a musical or theatrical group.	___	___	___	___
12. Put on a puppet show for younger children.	___	___	___	___
13. Started a business (for example: car wash, bicycle repairs, lemonade stand).	___	___	___	___
14. Designed a comic strip.	___	___	___	___
15. Painted or sketched interesting people, objects or landscapes.	___	___	___	___
16. Used a computer graphics program to design original artwork.	___	___	___	___
17. Wrote a letter or sent e-mail to the editor of a newspaper or a public official (Mayor, Congressperson, etc.).	___	___	___	___
18. Learned to play a musical instrument.	___	___	___	___
19. Wrote a song, opera or other musical composition.	___	___	___	___

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	Never	Seldom	Sometimes	Often
20. Learned a handicraft such as weaving, wood carving, or making jewelry.	___	___	___	___
21. Designed costumes, clothes or furniture.	___	___	___	___
22. Entered a contest (Example: chess, writing, art, athletic).	___	___	___	___
23. Put on a backyard show (circus, magic show, exhibition).	___	___	___	___
24. Built or designed a vehicle (model aircraft, rocket, hot air balloon, go-cart).	___	___	___	___
25. Developed film and printed photographs.	___	___	___	___
26. Created a spread sheet program to keep track of finances.	___	___	___	___
27. Designed a physical fitness program for yourself.	___	___	___	___
28. Learned another language.	___	___	___	___
29. Made up and used a secret code.	___	___	___	___
30. Used a computer software program to create a newsletter.	___	___	___	___
31. Kept a journal or diary for over a year.	___	___	___	___
32. Made and recorded observations of people or animals on a regular basis.	___	___	___	___
33. Planted and cultivated a garden.	___	___	___	___
34. Started a neighborhood project (paper drive, building a park, recycling program, etc.).	___	___	___	___
35. Read a news, science or literary magazine on a regular basis.	___	___	___	___
36. Raised animals to sell or to enter in a show or contest.	___	___	___	___
37. Made a video.	___	___	___	___
38. Performed as a comic, using original material.	___	___	___	___
39. Designed and maintained a computer bulletin board.	___	___	___	___

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ZOME SYSTEM

The Zome System is an exciting math and science manipulative system that is used from elementary school through high school. The heart of the Zome System is a spherical plastic connector node with 62 geometric holes. The nodes are connected to each other with shape- and color-coded plastic struts in Golden Section lengths. The angles and strut lengths are mathematically precise and allow users thousands of geometric structures.

While the Zome System is used by mathematicians, research scientists, NASA engineers, and architectural firms, it is compelling, fun, and easy to use for children as young as 6. The hands-on approach lets students use both visual/spatial and abstract/logical strengths to solve problems and understand advanced concepts Support for educators includes lesson plans and manuals, workshops in schools, and university recertification courses. A small selection of Zome System concepts includes:

ELEMENTARY SCHOOL

Number sense: connection of numbers to shapes in the real world
Symmetry and proportion
Working with 2 and 3 dimensions
Geometry: angles, area, perimeter, volume, and polygons
Tessellation and pattern recognition

MIDDLE SCHOOL:

Intermediate geometry, polyhedra and projection modeling
Numbers and structure in physics and architecture
Geometry connections: manifestations in science and fine arts
Mineral crystals and molecular structures
Advanced tessellation and packing in 2 and 3 dimensions

HIGH SCHOOl

Advanced geometry, fractals, topology
Fibonacci numbers and the Golden Mean in math, biology, and art
Algebra connections
Discreet mathematics
Modeling of DNA molecules, Buckyballs, and crystalline lattices

LESSON PLANS AND SUPPORT MATERIALS

ZOME System Lesson Plans 1.0 contains 64 easy-to-follow math-based activities with art, architecture, biology, physics, and applied technology extension. The document is divided into elementary, middle, and high school sections. All plans meet NCTM standards and contain assessment guides. Sample plans at http://www.zometool.com. Or from Zometool, 1526 South Pearl St., Denver, CO 80210. Call toll-free 888-966-3386.

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Module III
BUILDING ON STRENGTHS TO PROMOTE LITERACY SKILLS

OBJECTIVES

- To use students' strengths to help them attain basic literacy skills
- To identify how specific areas of the curriculum might be approached using intelligences related to the targeted skill

VIDEO GUIDE

Video Segment	**Page**
Pre-Reading	3
1 Mary Pree's class	6
2 Using the naturalist intelligence as an entry point	8
3 Character interview	11
4 Guided visualization	14
5 Summary	16
Interim Activity	17
Units, Lessons, and Tools	**19**
Planning Instruments for Building on Strengths	20
Whole Class Activity	21
Moral Dilemmas	22
The Moving Image	25
Readings and Resources	**31**

Our focus in this module is to find ways to build on students' strengths to improve literacy skills, in particular those required by the New York City English Language Arts Performance Standards. To build on students' strengths toward these goals we

- clearly identify the literacy skills our students need to master, and
- carefully construct the bridge that connects the learning experience with the literacy objective.

Building on strengths requires the purposeful arrangement of classroom experiences so that students can access the language arts curriculum through entry points aligned with their areas of strength or interest. This notion is not new and may seem obvious. In practice, however, students' strengths are not often a major consideration in how curriculum and instruction are arranged. Instruction is usually organized around teacher talk, and the products required most often necessitate strong writing before many students have experienced successful "pre-writing" activities.

By using our knowledge of students' strengths, we may enable students to transfer their successful learning experiences to areas that are more problematic. Transfer occurs when cues from a new setting resemble cues from previous experiences so that the student can recognize them (Hamilton and Ghatala, 1994). For instance, a student who has demonstrated superior artistic abilities in art class will often show similar learning behaviors when allowed to use art as a way to process information or as a means to demonstrate what was learned in other domains or disciplines. Transfer seems to occur best under certain conditions:

- The learner views himself as competent.
- The instruction in other areas incorporates the talent area (for instance, allowing the young artist the opportunity to draw a picture before writing the story).
- Students have the opportunity to discuss the strategies they used to help them master the curriculum.
- An adult guides and reinforces students' use of abilities transferred to the new areas. ("I remember that you have good visual ideas. Did you use imagery to plan your story?")

DIFFERENT APPROACHES TO BUILDING ON STRENGTHS

To build on students' strengths we have a choice:

- Provide entry point activities for certain students according to their particular strengths.
- Devise alternative entry points based on multiple intelligences in general, without reference to specific students, but with the goal of reaching more students.

These strategies are excellent for students who have strong abilities in intelligences other than language or math, especially spatial, musical and bodily kinesthetic intelligences. They are also effective with students who experience difficulty learning literacy skills using standard English, perhaps because of learning disabilities, English being their second language, or nonstandard English dialects used in their home environments.

The purpose of the following video segments is to illustrate experiential activities that serve as entry points for targeted literacy activities. You will be asked to try out some of these activities with a partner in this session. Once you've practiced with colleagues and then talked about the experience, you will be asked to consider if and how you might use these activities as entry points in your own classroom. Additional activities that tap different combinations of intelligences are provided in Units, Lessons, and Tools.

SCAFFOLDING

To bridge from the other intelligences to literacy skills we use a teaching method known as scaffolding. In its most common usage, scaffolding includes cueing, questioning, coaching, corroborating, and providing information, to support students in completing a task before they are able to do so independently. This concept, introduced by Wood, Bruner, and Ross (1976), describes the role of the teacher in enabling a student to solve a problem that requires more than her individual efforts. Scaffolding involves helping students concentrate on and complete tasks that are within their immediate capability before they move on to tasks beyond their capacity. Teachers provide support "in ways that facilitate growth while they extend the range of the student, and permit the accomplishment of tasks not otherwise possible. Scaffolding involves guidance in leading the student to first solve problems collaboratively, and then moves these partial skills toward independent problem solving" (Wood, 1976). Several examples of scaffolding are illustrated in the following video examples.

VIDEO GUIDE

SEGMENT 1: MARY PREE'S 5TH AND 6TH GRADE CLASS

BACKGROUND

The skill of writing narrative procedures is required by the New York City Performance Standards for Language Arts. Although there are several steps before the students complete final drafts, Ms. Pree uses scaffolding to bridge from the building experience to the writing assignment.

WHAT TO EXPECT

Who: Mary Pree

What: Ms. Pree taps her students' spatial and bodily kinesthetic intelligences through a construction experience that will help prepare them to write narrative procedures

Where: The Island School, District 1

Why: To demonstrate alternate entry points and effective scaffolding in bridging from building to writing narrative procedures.

WHAT TO FOCUS ON

There are two parts in this videotaped example. In the first part Ms. Pree reflects on using this MI approach to serve her goal of strengthening her students' writing skills. The second part illustrates skill with scaffolding, as seen in Ms. Pree's interactions with her students. You may want to play the segments more than once.

PLAY FIRST PART OF TAPE

PAUSE TAPE FOR REFLECTION EXERCISE

SUGGESTED TIME: 5 MINUTES

Reflect on what you just observed. In your opinion, what are the most cogent arguments to support this approach to preparing students for the writing assignment?

YOUR NOTES

PLAY SECOND PART OF TAPE: WRITING NARRATIVE PROCEDURES
PAUSE TAPE

DISCUSSION: SCAFFOLDING EXAMPLES

SUGGESTED TIME: 5 MINUTES

Discuss your observations as Ms. Pree demonstrated examples of scaffolding in bridging from building to writing.

Ms. Pree observes that there is greater depth in her students' writing as a result of this activity. Why do you think this activity allows them to add more details to their writing? What might be some of the reasons that students are better able to write about their building experience?

YOUR NOTES

SEGMENT 2: USING THE NATURALIST INTELLIGENCE AS AN ENTRY POINT

BACKGROUND

Ms. Durham's use of MI is based on analyzing the elements of the skills she wants to teach and finding an alternate entry point to teach these skills. Since she wants her students to acquire thinking skills in classification and categorization, she taps into the naturalist intelligence, which is particularly geared to observing attributes and characteristics of the natural world. However, Gardner speculates that the naturalist intelligence is activated when recognizing patterns and attributes of "stuff" in our consumer society: hunting and gathering for the 21st century.

WHAT TO EXPECT

Who: Stephanie Durham

What: A whole class activity with 1st graders

Where: P.S. 270, District 13

Why: To demonstrate the use of the naturalist intelligence as an entry point to language development, specifically

- building vocabulary to describe the concrete world
- organizing words into groups to form abstract concepts
- observing, understanding, and articulating both concrete and abstract relationships

Ms. Durham will bridge classification and categorization activities to basic literacy skills, including learning new vocabulary, reading, and writing. The lesson is sequenced as follows:

1. Children share what they expect to find on a walk in the park, and Ms. Durham records their words on a flip chart.
2. Working in groups of 4-6, children collect items in park.
3. Children return to classroom and share items they hadn't expected to find.
4. Groups arrange like items, creating groups, e.g., leaves, rocks, berries, etc.
5. Children report their initial groupings of items.
6. Children are asked to reduce their groupings to two categories, each category having one common element (e.g., things that come from trees).
7. Children report on what is in their two new categories.
8. Children state similarities and differences of things within various categories; Ms. Durham records their observations.
9. Children begin to document this experience, in the form of letters, journal entries, and drawing.

WHAT TO FOCUS ON

Focus is on the children's behavior during this activity, as well as Ms. Durham's questions and comments (scaffolding) which serve as a bridge from the naturalist intelligence to their more fluent use of verbal concepts and precise language.

You may want to play the segment more than once.

PLAY TAPE
PAUSE TAPE FOR DISCUSSION

SUGGESTED TIME: 5 MINUTES

Reflect on what you just observed.

- What examples of the naturalist intelligence did you see?
- What examples of scaffolding do you think helped the children to
    - build their vocabulary to describe the concrete world?
    - organize words into groups to form abstract concepts?
    - observe, understand, and articulate both concrete and abstract relationships?

YOUR NOTES

APPLY YOUR UNDERSTANDING

We've explored two approaches to building on strengths to improve literacy skills. In the case of Ms. Pree's group, we saw how individual students' strengths inform entry points. With Ms. Durham, we saw how multiple intelligences suggest entry points for a specific skill for the entire class.

Take five minutes to try a planning activity, using both individual student and whole class approaches. Examples and planning forms are below. (Planning forms are adapted from Baum et. al., in press.)

WHOLE CLASS ACTIVITY

Learning Objective: Persuasive essay

Multiple intelligences to consider to enhance learning:

Interpersonal: How do I persuade others of my point of view?

Intrapersonal: What is my point of view on this issue? Why do I feel this way?

Entry point activities or instructional strategies: Moral Dilemma

[See Moral Dilemma in Units, Lessons, and Tools.]

Anticipated results: Students will be better able to write a persuasive essay.

WHOLE CLASS ACTIVITY PLANNING FORM

Learning Objective:

Multiple intelligences to consider to enhance learning:

Entry points activities or instructional strategies:

Anticipated results: Students will be better able to ...

INDIVIDUAL STUDENT ACTIVITY

Learning Objective: Narrative procedure

Student's strengths to consider to enhance learning:

Bodily kinesthetic: He's teaching his younger brother to play football.

Entry point activities or instructional strategies:

Suggest narrative procedure on teaching football skills and rules to newcomers.

Anticipated results: James will be engaged with the topic and write in detail.

INDIVIDUAL STUDENT PLANNING FORM

Learning Objective:

Student's strengths to consider to enhance learning:

Entry point activities or instructional strategies:

Anticipated results: Students will be better able to ...

You might want to break now. The next session requires 45–60 minutes to complete.

SEGMENT 3: CHARACTER INTERVIEW

(Activities adapted from Freestyle Repertory Company, 1998)

BACKGROUND

One way that compelling narrative accounts build reader interest is through complex characters. When we use an MI lens to examine the elements of the writing skill involved in creating complex characters, we find that improvisational role-plays are a natural entry point for students with strengths in the inter/intrapersonal and bodily kinesthetic intelligences. Role-plays help students create flesh and blood characters with specific traits, attitudes, and dilemmas, which is a central element of good narrative or dramatic writing. At the MI institute, teachers learn how to use a technique called Character Interviews.

WHAT TO EXPECT

Who: A.J. Mass and Christine Turner from Freestyle Repertory Company

What: Actors illustrate an alternative entry point to narrative writing.

Where: MI Institute for NYC teachers

Why: To demonstrate an alternative entry point to stimulate participants writing about characters

WHAT TO FOCUS ON

After you observe this video example you will have an opportunity to experience the character interview activity yourself. The Character Interview activity in Units, Lessons, and Tools in Module II is part of a sequence of improvisational activities that can be used to assess strengths in personal and bodily kinesthetic intelligences. Remember to do warmup activities when you do improvisations such as Pop Quiz or Gift Giving (in Module II) with your students for the first time.

PLAY TAPE

PAUSE TAPE

ACTIVITY

SUGGESTED TIME: 5 MINUTES FOR EACH PARTNER, 5 MINUTES TO DEBRIEF ACTIVITY AS A GROUP

Practice character interviews with a colleague. Instructions follow.

CHARACTER INTERVIEWS

AIM

Develop skills in writing about complex characters in connection with narrative accounts (fictional or autobiographical), required by the Language Arts Performance Standards.

WHAT THIS LESSON WILL ACCOMPLISH FROM AN MI PERSPECTIVE

This lesson uses the personal and bodily kinesthetic intelligences as entry points to help students invent characters and think about the dimensions that make up complex characters, in preparation for writing narrative accounts. The personal and bodily kinesthetic intelligences predominate because "players" are acting out parts, rather than simply questioning and describing the attitudes and interests of their "characters."

MOTIVATION

This is a chance to give your imagination a workout. There can be no wrong answers. In this activity you'll see how perceptive you can be about why people think and act the way they do.

There are only two rules:

- ALWAYS say "yes," which means go along with your partner's idea whenever possible and go along with your own, as well!
- ALWAYS make your partner look good, which means try to be positive in all of your responses to your partner.

PROCESS

1. Pair off. Decide who will be interviewer and who will be interviewee.
2. Each character to be interviewed is given:
   - a name
   - a job (it may be unusual)
   - an attitude toward life
3. To start off, the interviewee appears to be doing something in connection with her job. The interviewer asks open-ended questions and goes along with the answers. Questions, which draw the character out, are usually around her likes and dislikes, family situation, work, etc. The goal is to offer as much detail as possible about the objective and subjective reality of the character, which in turn will generate good material for a writing exercise as well as insights into complex characters in literature.
4. Repeat the process, switching roles from interviewer to interviewee.
5. When the activity is over discuss the following questions:
   - What did you like about this activity? Did you have a preference for the role of interviewer or the role of interviewee?
   - What did you dislike?
   - How did the interviewer's questions help to shape the character?
   - How did the character's behavior help to inspire the interviewer's questions?
   - Do you feel you could begin to write a narrative about this character? In

particular, do you think you could use this activity to stimulate writing (or reading) that examines the reasons for a character's actions? Why?

- In what way do you feel your multiple intelligences were tapped in this activity?
- In what way can you see adapting this technique as an entry point?

SEGMENT 4: GUIDED VISUALIZATION

BACKGROUND

Good narrative writing can be stimulated by a mental image of a setting. For students with strong spatial intelligence, teachers can engage them in guided visualization as an entry point before asking them to write.

At the MI Institute, Richard Weston indicated he thought he was an "expert" artist in the initial MI simulation activity. In the video sequence that follows, you will see Mr. Weston participate in a guided visualization activity.

WHAT TO EXPECT

Who: A.J. Mass (actor) and Richard Weston (Assistant Principal, Charles R. Drew Middle School, District 9)

What: Mr. Mass conducts an experiential exercise

Where: MI Institute for NYC teachers

Why: To demonstrate the spatial intelligence as an entry point, stimulating narrative writing about setting

WHAT TO FOCUS ON

After you observe this video example you will be offered an opportunity to experience the guided visualization activity yourself.

PLAY TAPE

PAUSE TAPE FOR DISCUSSION/ACTIVITY

SUGGESTED TIME: 5 MINUTES FOR EACH PARTNER, 5 MINUTES TO DEBRIEF ACTIVITY AS A GROUP

Practice guided visualizations with a colleague. Instructions follow.

AIM

To develop skills in writing about setting, in connection with fictional or autobiographical narrative accounts. This is a New York City Language Arts Performance Standard.

WHAT THIS LESSON WILL ACCOMPLISH FROM AN MI PERSPECTIVE

This lesson uses spatial intelligence as an entry point to help students include sensory details and concrete language to develop plot and setting in preparation for writing narrative accounts.

MOTIVATION

This is a chance to picture yourself in a place that you know, either from first-hand experience or from what you've seen or read in the media. Add as many details as possible so that the place you see in your mind could seem real to somebody else when you describe it. You'll discover how much you see in the pictures in your mind.

PROCESS

1. Pair off. Decide who will be interviewer and who will be interviewee.
   - As the interviewee, close your eyes, and picture the place you want to describe. Choose a name for the place and tell it to the interviewer.
   - The interviewer asks a series of open-ended questions. The follow-up questions are often based on the previous answers; for example, if someone says there are tables in a room, you should ask, "What is on top of the tables?"
   - Ask questions about smells, sounds, temperature, colors, and textures; what you see outside of windows and doors; who the people are in this setting; what their appearance is, etc.? You can also ask about feelings, like: What do you like about this place or What don't you like about it? In addition, you might ask for predictions, like: What do you expect to happen?

   The questions should elicit as much information as possible, generate sensory details, and elicit concrete language about a particular setting; these can serve as a key element in a written narrative account.
2. Repeat the process, switching roles from interviewer to interviewee.
3. When the activity is over discuss the following questions:
   - What did you like about this activity? Did you have a preference for the role of interviewer or the role of interviewee?
   - What did you dislike?
   - How did the interviewer's questions help you visualize the place?
   - How did the answers help to inspire more questions?
   - In what way do you feel your multiple intelligences were tapped in this activity?
   - In what ways could you adapt this activity as an entry point? In particular, do you think you could use this activity to stimulate writing (or reading) that examines setting across various subject areas. How?

SEGMENT 5: SUMMARY OF MODULE 3

WHAT TO EXPECT

Who: Mr. Wali

Why: Review of key points

PLAY TAPE

END TAPE: REVIEW KEY POINTS

SUGGESTED TIME: 2 MINUTES

An MI approach to building on strengths suggests that, instead of relying solely on remediation in an area of difficulty, we use combinations of intelligences as entry points to improve writing skills across disciplines.

Building on strengths to promote literacy skills requires clearly identifying the literacy skill objective we want our students to master, and then, either...

- focusing on individual students' strengths to tailor entry points, or
- examining the elements of the skill and finding an appropriate MI-informed alternative entry point to teach the skill.

Turn "teacher talk" into scaffolding, which provides the cueing, questioning, coaching, corroboration, and plain old information our students need to acquire their literacy skills.

INTERIM ACTIVITY

Before your next meeting, try to make further use of the ideas in this module. You may use the planning guides below to assist you. Additional planning guides appear in Units, Lessons, and Tools.

PLANNING GUIDES

(Baum, et. al., in press)

WHOLE CLASS

Learning Objective _____

Multiple intelligences to consider to enhance learning

_____

_____

_____

Entry point activities or instructional strategy

_____

_____

Anticipated results _____

_____

INDIVIDUAL STUDENT

Learning Objective _____

Student's strengths to consider to enhance learning

_____

_____

_____

Entry point activities or instructional strategy

_____

_____

Anticipated results _____

_____

PROCESS

- Discuss your ideas and plans with a colleague; revise your plan accordingly.
- Implement your plan between your first and second sessions.
- Discuss your practice with a colleague. What went well? What did you learn? How could you improve?

DEBRIEFING INTERIM PRACTICE

Discuss your interim practice with colleagues before you begin Module IV. Limit this discussion to approximately 10 minutes if you want to complete the first session of Module IV in 1 hour or less.

Possible discussion questions include:

- Were students more engaged?
- Did you see greater evidence of:
  - problem solving?
  - linking to prior knowledge?
  - asking questions?
  - seeking more information?
- Did the students achieve greater mastery of skills?
- What did you learn that you might incorporate into further application of this approach?

YOUR NOTES

UNITS, LESSONS, AND TOOLS

PLANNING INSTRUMENTS FOR BUILDING ON STRENGTHS

(Baum, et. al., in press)

Below are planning guides for practicing how to use students' strengths as a bridge to mastering literacy skills. Continue to apply this technique. It will strengthen your practice if you share your plans and your process with a colleague.

- Select a skill and entry points to enhance students' skill mastery.
- Use the planning instruments on the following pages.
- Discuss your ideas with a colleague; revise your plan accordingly.
- Implement your plan.
- Reflect upon your results. Discuss with your colleagues.

INDIVIDUAL STUDENT

Learning objective (literacy skills) _____

Student's strengths _____

_____

_____

Entry point activities or instructional strategy

_____

_____

Anticipated results _____

WHOLE CLASS ACTIVITY
(Baum, et. al., in press)

LEARNING OBJECTIVE

Multiple intelligences to consider to enhance learning

_____

_____

Entry point activities or instructional strategy

_____

_____

Anticipated results _____

Use the following questions to help you assess your progress:

Attention

Was there a change in the students' ability to focus on the task?

Engagement in learning

Did the students remain actively engaged during the lesson?

Skill acquisition

Did the students improve their skill?

Was the learning objective accomplished?

Student attitude:

Did you notice a change in the students' motivation during the activity?

Student confidence and self-efficacy

Did the students seem to exhibit confidence during the activity?

Student self-regulation

Did the students seem to be taking charge of their own learning?

MORAL DILEMMAS

This lesson for grades 4 and up can be used in the language arts or social studies curriculum in connection with the NYC Performance Standards in Speaking, Listening and Viewing [E3b] and Writing Persuasive Essays [E2e].

AIM

To develop skills in connection with speaking, listening and viewing, reasoning, and writing persuasive essays.

WHAT THIS LESSON WILL ACCOMPLISH FROM AN MI PERSPECTIVE

The lesson uses the personal intelligences as entry points to help students understand and make informed judgments based on analyzing information and exploring their own and others' points of view regarding questions or situations that raise moral issues.

The students will explore their own feelings and beliefs as well as those of their classmates as they gather and share information and points of view, persuade others, and express and listen to ideas. Additional group strategies tap other intelligences: role playing (bodily kinesthetic), illustrating endings (spatial), and identifying logical reasons for positions (logical-mathematical).

This lesson will also help students:

- use problem solving by learning to clarify issues raised by dilemmas
- think for themselves
- relate information and experiences to the dilemma
- pay attention
- cooperate with peers and negotiate
- use self-regulatory behaviors as they make appropriate contributions in their small groups

MATERIALS

Film clips, role plays, written scenarios, photographic essays, news clips, etc. might all be excellent to present the dilemma, so long as they pose a moral question to which students can readily relate. The moral dilemma story on the following page, *The Heinz Dilemma* (Kohlberg), is an example of a brief written scenario.

HEINZ DILEMMA ACTIVITY

(Activity adapted by Baum, et. al., in press)

In Europe a woman was near death from a rare kind of cancer. There was one drug that doctors thought could save her. It was a form of radium recently discovered by a druggist, Brost, who lived in the same town as the woman and her husband.

The drug was expensive to make, but the druggist was charging ten times what the drug cost him to make. He paid $200.00 for the radium and charged $2000.00 for a small dose.

The sick woman's husband, Heinz, went to everyone he knew to borrow money, but he could only get together about $1,000.00, which was half the cost of one dose. He told the druggist his wife was dying and asked him to sell it cheaper or let him pay later. Brost said, "No. I discovered the drug and I'm going to make money from it." So Heinz became desperate and broke into the man's store and stole the drug for his wife.

QUESTIONS

- What would you do if you were Heinz?
- Should Heinz have stolen the drug?
- Should Heinz be arrested?
- If you were the judge would you find Heinz guilty?
- Should the druggist be arrested?
- Should there be socialized medicine?

PROCESS

Warmup questions

Lead the students in a brief warmup discussion that prepares them for the story in the moral dilemma. These questions elicit responses, which allow students to begin identifying with the circumstances of the dilemma, and to create a more genuine context for the dilemma story that follows. Questions for the Heinz Dilemma story may include:

- Have you ever heard about or known of situations in which individuals felt they had to steal and that stealing was justified?
- Have you ever thought that health care was too expensive?

Presentation

Present the dilemma story to the students. Dilemma stories can be presented in a variety of ways. Films, filmstrips, and audio-tapes are available to be used with younger students. Teachers may act as storytellers and relate dilemma stories to students as a method of presenting the situation. You may set up role playing or role taking situations in which students assume roles of characters in the dilemma story and discuss the right thing to do from their character's point of view. This process also helps students develop skills in empathizing with and understanding issues from multiple viewpoints.

Ask initiating questions

1. Ask the students to clarify the issues and list choices for action.
2. Ask students to take a tentative position on the dilemma by raising their hands in support of the options generated and then have them write down two or three reasons for their choice.

Group work

1. Divide the class into groups based on similar positions. Have the groups discuss their choice and choose three major reasons to support their position. These reasons should be compelling and powerful to persuade the other groups.
2. Each group in turn takes a position. After each position is shared, students ask clarifying questions. The teacher may also pose probing comments and questions.
3. After all positions are shared, class members have an opportunity to change their positions and join another group.
4. Upon completion, the groups work together to create an end to the story. Groups can present their scenarios in their own creative way.

Illustrating the ending

Distribute drawing paper and markers to groups. Ask groups to discuss how the story should end, then make a drawing that indicates that ending. Each group can explain the illustration to the class, and the teacher can ask probing questions that may promote additional discussion. The other students should also be encouraged to ask questions of the group presenting its drawing.

Role plays

Give groups an opportunity to improvise a scene or two in which the scenario arrives at their preferred conclusion.

Closing strategies for reflection and bridge to writing

Closing strategies are a specific part of the dilemma process. They are designed to suggest to students that they continue thinking about the issues discussed as part of the dilemma story.

Students need specific suggestions for continuing to think about the issues involved in the dilemma story. For example, near the end of the class discussion, the teacher might personalize the dilemma by asking what students would do if they were personally faced-with a similar dilemma tonight. The teacher could also ask the students to silently consider one of the major questions of the dilemma, or ask, "Why is your solution to this dilemma the very best of all solutions?"

Writing assignment

Students are asked to prepare a persuasive essay relating to a critical aspect of the dilemma. Depending on the class, the assignment may include a research component related to the salient issues of the dilemma.

THE MOVING IMAGE

(Jessica Nicoll, Kelly Hayes and Mirla Peul, ArtsConnection Curriculum Adaptations)

GRADES 4+

This lesson is part of a language arts unit on poetry.

AIM

Develop poetry-writing skills using sensory imagery and creative dance.

WHAT THIS LESSON WILL ACCOMPLISH FROM AN MI PERSPECTIVE

The lesson uses the bodily kinesthetic, musical and spatial intelligences as entry points to help students understand and create figurative language.

Students will explore the characteristics of objects (weight, force, textures, shapes, etc.), as well as characteristics of music and movement to inspire their own poems.

This lesson will help students:

- use problem-solving by learning to transfer sensory experiences—of touch, movement, and listening to music—into creating poetic imagery
- pay attention—as they make appropriate contributions and comments

CONTEXT

It will work best if students are already comfortable with the use of movement in the classroom. Earlier experience with movement should include:

- the use of weight, shape, and qualities in movement improvisations (see "Gift Giving," Module II)
- moving through space without physically contacting others

MATERIALS

Paper bags (enough to have one bag for each group of five students) filled with sensory objects, such as:

- cotton ball, rubberband, rough rock, smooth marble, and soft fabric (silk/satin)
- pencils or pens for each student and enough index cards for each student to have at least 3 or 4

Musical selections to correspond to different textures:

Mark Isham "Tibet" (smooth), Tibetan Monks "Om" (rough rock), Bobby McFerrin and Yo Yo Ma "Hush" (rubberband), etc.

SPACE

You will want to arrange an open space in your classroom to allow for free movement by the students and to permit easy viewing of small group improvisations.

You will need to record students' comments on a chalkboard or flip-chart paper.

WARMUP

Lead the students in a brief warmup exercise that prepares them for exploring qualities of movement. The Gift Giving activity from Module II is an example.

A warmup is "Freeze":

- Students form a circle and count off "1, 2, 3," then repeat the sequence.
- Student #1 moves inside the circle (walking, skipping, hopping, etc.), and stops when you say freeze.
- Student #2 imitates student #1's frozen pose.
- Student #1 returns to edge of the circle. Student #2 begins a different movement sequence inside the circle. You say freeze.
- Student #3 imitates student #2's pose. Continue, with the next student (#1, then #2, then #3, etc.), until all have had a turn.

IDENTIFYING QUALITIES FROM A BAG OF "THINGS"

- Break the class into groups of five. Each group receives a bag with five objects in it.
- Each student picks one object from the paper bag, examines and touches it.

When every student has thoroughly examined his or her chosen object, everyone should pass that object to the right. Allow ample time for each student to touch every object and to discuss the characteristics of each object. As the students are examining the objects the teacher can help focus them by asking and/or displaying sample questions.

SAMPLE QUESTIONS

- What things do you notice about the object?
- What is the shape of the object? Can its shape change?
- Are there any cracks in this object? Does it have sharp edges or indentations?
- Is this object rough or smooth? Some of both? What other textures does it have?
- Does the object have a smell? A sound?
- What happens to this object when you drop it? When you try to pull it apart?

These questions can be repeated each time you pass an object.

GROUP DISCUSSION

Choose one object at a time to discuss with the class. Ask the groups to share what they discovered about the qualities of each object (e.g., satin fabric: soft, light, floats when you drop it, can change shape, etc.) and list the students' ideas on the board.

MOVEMENT IMPROVISATION (SMALL GROUP)

Ask the students to think about one of the objects they explored. Each member of the group should choose a different object. Choose one of the objects to explore first and ask those students who are thinking about that object to spread out in the dance space. The rest of the students will be observing the first improvisation.

Lead students in a movement exploration focused on the qualities of the object they've chosen, using the music you've selected for each object. (See guidelines for leading a movement activity in ArtsConnection's *Using the Creative Process: Creative Dance.*)

It is important that the teacher guide the students beyond a literal interpretation, or the students might become "rocks"—or whatever the object is—and curl up on the floor motionless. The teacher should help students imaginatively transform the objects by giving them reminders such as:

"Imagine a rock could move on its own. What kind of steps would it take? How would it leap or jump? What shapes can you make with your body that show the shape and texture of a rock?"

As the students improvise with movement qualities, the teacher will guide the improvisation with questions that help deepen their understanding of the object's characteristics.

SCAFFOLDING QUESTIONS

- Take the shape of the pieces of fabric you examined. Move through the room with the qualities of that fabric. Let the music help you capture those qualities.
- Can you put that floating (heavy, rough, jiggly, etc.) movement in your elbow, head, or another part of your body?
- Think of how that fabric traveled side to side when you dropped it. Can you travel in the same way?
- Explore the way the rubber band's size and shape can change.
- Can you include stillness with your movement?
- Can you do that sharper/smoother; heavier/lighter; looser/tighter?

After the students have had 1-3 minutes for their exploration, bring the improvisation to a close by fading out the music and asking the dancers to hold the final shape that reflects their object's characteristics.

OBSERVATIONS

After each exploration, have observers comment on what they saw.

SCAFFOLDING QUESTIONS

- Were the dancers successful in expressing the qualities of the object?
- Did the music help convey the idea of floating (roughness, sharpness, etc.)?
- How did the dancers move? What caught your eye?
- What kind of shapes, speed, texture, weight, levels, etc., did you see?
- Other suggestions?

Note responses on the board. Allow time for exploration, discussion, and interaction as students discuss imagery and how they might verbally describe sensory images. Invite comments on the experience of watching or being in the improvisation as an artistic experience.

ADDITIONAL SCAFFOLDING QUESTIONS

- What worked or didn't work, visually or physically? How could the dancers make their ideas clearer?
- What patterns were created? Did you see spatial patterns, rhythmic patterns? Did you notice contrasting stillness and movement?
- What happened when you heard the music? What did you feel? What images came to your mind as you were dancing or watching?
- How did this object work as a theme for a dance?

After the discussion, have the students improvise on their theme again, focusing on the observation that might improve the dance. Facilitate a discussion about the second performance with the students.

Repeat the above process for each object in the bags.

LINK DANCE AND LANGUAGE

Discuss the dance process and its connection to language.

QUESTIONS

- What about the dance experience was surprising?
- What did you learn from the dance experience that was different from what you learned looking at and exploring the objects?
- Did the music affect the imagery you thought of? How?

FINDING IMAGERY

Place a pile of index cards with each group. Direct students' attention to the words on the board, both descriptive words and new imagery that grew out of the creative dance exploration. Ask each student to choose one of the words or images and to write it on an index card. They may be interested in two or three different words or phrases; they can write each of them on a separate index card.

POETRY WRITING

When each group has a small stack of words, tell them they will be arranging them to create a poem collaboratively. They may choose, as a group, to select one of the objects they explored or saw presented as a topic for their poem. They might like to focus on an image that occurred to them while moving or observing. Perhaps an image came to mind during the class discussion. Or they may decide to look over the words the group members chose and see where these lead them in creating an original, descriptive poem.

Give students ample time to play with their words and arrange them as they like. They can add words at any time—either from the list or from new ideas. When they feel their poem is complete, ask them to rewrite it on a separate piece of paper or poster board.

PRESENTATION OF POEMS

When all the groups are ready, ask them to present their work to the whole class. They may want time to choreograph or work out the rhythmic structure of their presentation.

DISCUSSION

End with a discussion about the dance process and its connection to the writing process.

QUESTIONS

- Talk about the experience of writing after exploring qualities of movement. Was it difficult? easy? surprising? Did moving before writing lead to new ideas?
- How did your group work to create a poem together? What did you like about that group process? What didn't you like about it?
- Did your group use everyone's ideas? Did other people's ideas affect your own?
- Would you like to write a poem on your own after another dance improvisation?

FOLLOW-UP

Using the knowledge and understanding gained from this lesson, the class, as a whole, can design other movement improvisations and relate them to writing projects. Just a few ideas:

- The students might like to take the poems created during this lesson and make up new dances inspired by the writing.
- Some students might want to make drawings based on (1) the descriptive language and the imagery that grew out of these improvisations; (2) the music heard during the improvisations; or (3) watching a group of dancers improvise based

on the qualities of objects (for example, the "smooth" quality of silk). The drawings might also provide a new motivation for dance making and writing projects.

- Each student can write his or her own poem generated through the movement experience.
- Try reversing the order: have students write first, then explore their ideas in movement.

READINGS AND RESOURCES

MINDS AT WORK:
APPLYING MULTIPLE INTELLIGENCES IN THE CLASSROOM

(Excerpts from Mara Krechevsky and Steve Seidel (1998). Minds at Work: Applying Multiple Intelligences in the Classroom. In J. Sternberg & W. Williams, eds. *Intelligence, Instruction, and Assessment.* Mahwah, NJ: Lawrence Erlbaum. Permission pending.)

INDIVIDUALIZING STUDENTS' EDUCATION

One implication of MI theory for instruction is that teachers need to get to know their students well enough to become familiar with each student's interests, strengths, and weaknesses, and shape their instructional practices accordingly. Of course, Gardner is not alone in suggesting that education needs to be individualized. Sizer (1984, 1982), the founder of the Coalition of Essential Schools at Brown University, also wrote about the critical importance of teachers knowing their students well. At the elementary level, Comer (1988) talked about the value of understanding six developmental pathways (physical, psycho-emotional, socio-interactive, cognitive-intellectual, speech and language, and moral) along which all children progress. The theory of multiple intelligences and the way the mind works supports such educational beliefs and practices.

MI provides a framework for individualizing education by helping us to understand the full range of students' intellectual strengths. Traditional schooling has focused on developing only math and language as cognitive abilities. Teachers who use a multiple intelligences framework recognize other abilities -musical, bodily kinesthetic - as cognitive, too. But opening one's eyes to thinking about these other competencies in new ways is not enough. We must also be prepared to test and support hypotheses about a student's strengths. Several research and development projects have explored ways to do this in the classroom.

Project Spectrum, a collaboration between Harvard Project Zero and Tufts University, is an approach to curriculum and assessment in early childhood that gives teachers tools for identifying and providing evidence for children's strengths in different areas (Chen, 1993; Krechevsky, 1994). Spectrum researchers devised assessments ranging from structured activities to observational checklists in such domains as movement, music, science, art, and social understanding to help teachers recognize the various ways students can use their intelligences. For example, Spectrum divides the movement domain into athletic and creative movement. Athletic movement abilities include power, agility, speed, and balance, and creative movement includes body control, sense of rhythm, expressiveness, and generation movement ideas. This delineation helps teacher make sense of key aspects of a domain with which they may not be familiar. Once a student's strengths and interests have been reliably identified, they either can be nurtured further or used to engage students in areas of difficulty.

At the middle school level, students themselves can become recorders of their own strengths and can work with teachers to individualize their assignments. In the Practical Intelligence for School (PIFS) Project, a collaboration between Harvard Project Zero and Yale University, students are encouraged to learn about their own intelligence profiles and how to draw on their interests and strengths in carrying out their schoolwork (Gardner, Krechevsky, Sternberg, and Cagaki, 1994; William et. al., 1996). PIFS is an effort to help students succeed in school in part by helping them understand the nature of school, why they attend, and how school activities can be useful in their current and future lives. One of the PIFS curriculum units introduces students to different notions of intelligence and encourages them to take more responsibility for their own learning. Students personalize their education by learning about how they learn best, reflecting on and sharing past experiences that reveal special talents and/or interests, and engaging in problem-solving tasks and challenges that can be resolved in a variety of ways. These types of experiences and related

discussion and reflection enable students to take more control of their education and build on their strengths by tailoring assignments to their own interests.

Decisions about whether to offer all students a broad education in many or all areas addressed by MI, or whether to tailor students' education to develop their strengths or remediate their weaknesses, may depend on the developmental level of the students. Many schools using MI choose to offer broad exposure early on, with increasing focus and specialization as students get older. One reason for adopting this approach is the belief that it is especially important in children's younger years to introduce them to many forms of expression and meaning-making to provide them with experiences that are as rich as possible. But as students get older, going into depth in many different subject matters is simply not possible. Also, the pressures of college entrance exams and the job market demand that students be proficient in certain domains. Therefore, schooling appears to become more focused. However, even with more circumscribed curriculum, MI theory can be useful in helping students develop competence.

TEACHING SUBJECT MATTER IN MORE THAN ONE WAY

MI leads to teaching subject matter in multiple ways, providing students with different points of entry into learning a topic. Gardner talks about experts as individuals who are able to represent and explain thoughts and concepts in more that one way. The more ways a teacher can explain or teach a topic or concept, the more likely that both the teacher and the students will understand it deeply. Because most teachers do not feel comfortable or knowledgeable enough to teach by drawing on a variety of intelligences, applying MI in the classroom often leads to team teaching or bringing in community experts to share their expertise. In one elementary school with three kindergartens, each teacher focused on developing her curriculum in two domains and then the children rotated among the three rooms. Classroom teachers often team up with the school's specialists to share knowledge and information about the children.

In his book *The Unschooled Mind,* Gardner (1991) claimed that any substantive topic can be approached in at least five ways—through the use of narrative, logical analysis, hands-on experience, artistic exploration, and philosophical examination (Gardner has since added participatory/interpersonal experience). For example, students can learn about the theory of evolution by reading about Darwin and his trip on the Beagle (narrative); examining quantitative relationships in breeding dominant and recessive traits (logical); breeding fruit flies for certain characteristics (hands-on); looking for and drawing patterns of similarities and differences in fruit flies' wings (artistic); addressing fundamental questions such as whether evolution yields progress in all things (philosophical); or working together on a project where students assume different roles (interpersonal).

The experiences of two college-level English classes (one for students with learning disabilities) illustrate how students learn to articulate and craft arguments in writing using bodily kinesthetic and spatial techniques (Klein & Hecker, 1994). In these classrooms, the teacher asked students to represent their arguments by walking across the room, changing direction to reflect shifts in logic. Students thought out loud as they stepped out their essays, asking themselves questions about where they wanted to go and how they could get there. New information was represented by a step forward, contradictory information by a step back and additional examples by steps to the side. Having students step out their narratives seemed to trigger ideas, help word retrieval, and aid in the sequencing of events.

Another set of strategies entails asking students to build models of the relationships between their ideas using colored pipe cleaner, Legos™, or Tinkertoys™. Rather than generating a written outline for an essay, students created models with different components of the essay like the

introduction, main points, and conclusion. Seeing concretely how different ideas are linked helped the students develop an overall sense for how the essay comes together. To bridge the spatial and linguistic domains, the teachers asked the students to describe and explain what they have built. Klein and Hecker reported that after several papers, students only had to imagine manipulating blocks or walking out an essay to write in a clear and organized fashion.

FREESTYLE REPERTORY THEATRE

Executive Director: Michael Durkin.

120 West 86th Street, Ste. 1-A, New York, NY 10024

(212) 642-8202

WORKSHOPS

Residencies are 1,3,5 or 10 days in duration with two 45-minute back-to-back workshops per day with 2 Freestyle instructors

THE WRITE STUFF

Objectives/Description:

The "Write Stuff" brings the collaborative spontaneity of improvisation to the written page. Using adaptations of improvisation games, students are encouraged to create written rough drafts, getting their ideas down on paper quickly before they disappear in premature self-editing. Simultaneously they are inspired to describe the environment of their story, to develop the characters that inhabit that environment and to build the narrative structure following the basic story-telling technique that Freestyle utilizes in its creative process.

IMPROV YOUR MIND

Objectives/Description:

- Introduces Theatre

  The students will see theatre as exciting by experiencing the interactivity between the audience and the performer. Each exercise uses their suggestions and all the students participate.

- Demonstrates a Supportive and Collaborative Process

  The improvisers use the essential elements of improvisation: teamwork, cooperation and trust in their partner, saying "yes" to all their creative offers.

FURTHER INFORMATION/REFERENCES

Kris Goldin, Executive Director, Young Audiences NJ. (609) 683-7966

Barry Oreck, Program Director, ArtsConnection. (212) 302-7433

Nan Westervelt, Executive Director, Young Audiences, Rochester. (716) 271-4080

ADDITIONAL READINGS

ArtsConnection. *Using the Artistic Process.* NY, NY: Contact ArtsConnection.

Graves, M., Graves B., and S. Braaten. "Scaffolded Reading Experiences for Inclusive Classes." *Educational Leadership,* Feb. 1996.

Krechevsky, M. and S. Seidel. "Minds at Work: Applying Multiple Intelligences in the Classroom." In: R. Sternberg and W. Williams, eds. *Intelligence, Instruction, and Assessment.* Mahwah, NJ: Lawrence Erlbaum, 1998.

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Module IV
USING MI THEORY TO DEEPEN UNDERSTANDING

OBJECTIVES

- To explore applications of MI theory to deepen students' understanding of complex concepts
- To learn to apply MI theory to assess students' understanding of or their continuing difficulties with complex concepts.

VIDEO GUIDE

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> Along with other school reformers, I am convinced that schools attempt to cover far too much material and that superficial understanding (or non-understandings) are the inevitable result. It makes far more sense to spend a significant amount of time on the key concepts, generative ideas, and essential questions and to allow students to become thoroughly familiar with these notions and their implications. Once the decision has been made to dedicate time to particular items, it then becomes possible to approach those topics or notions in a variety of ways. Not necessarily in seven [eight] different ways, but in a number of ways that prove pedagogically appropriate for the topic at hand. Here's where MI comes in. As I argue in *The Unschooled Mind,* nearly every topic can be approached in a variety of ways ranging from the telling of a story to a formal argument to an artistic exploration to some kind of hands on experiment or simulation. Such pluralistic approaches should be encouraged. (Gardner, 1995)

This module explores a way to use MI theory to deepen understanding of key concepts. "Key concepts" refers to the larger themes and questions examined within and across every academic discipline. "Pluralistic approaches" refers to the multiplicity of perspectives we bring to complex concepts or topics. For example, an art historian and an anthropologist would bring particular perspectives to the study of an ancient pyramid. The art historian would be interested in aesthetic characteristics of paintings, carvings, jewelry, etc. found inside the pyramid—largely relying on his spatial intelligence (and the "symbol system" of images) to perceive and interpret visual information. The anthropologist would be interested in the society that produced the pyramid, tapping a combination of logical-mathematical, interpersonal, linguistic, and spatial intelligences and their symbol systems, to perform the following tasks: obtain quantitative information related to the size, age, and characteristics of artifacts; obtain visual information and use verbal imagery to "translate" hieroglyphic texts; and interpret and communicate the societal fears and strivings that produced the pyramids.

This module builds on the practice of using multiple entry points (featured in Module III in connection with literacy skills). From a comparative standpoint, an entry point, such as a building experience, provides access to learning through experientially engaging various multiple intelligences; a "perspective" calls for tasks and symbol systems commonly associated with a formal discipline or domain.

We now turn our attention to using multiple entry points to promote in-depth understanding of complex concepts. We'll usually connect these "entry points" to particular perspectives, such as an engineer's perspective or an ecologist's or a herpatologist's perspective.

Gardner asserts that students' understanding is evidenced by an ability to apply a concept to a new situation or context and express understanding using more than one symbol system. In other words, could we invite students' to demonstrate their understanding of key concepts and big ideas using their multiple intelligences and related symbol systems? For example, could they draw a picture, build a model, write a play, choreograph a dance, or compose a musical piece and demonstrate their understanding?

To begin, we invite you to experience this approach with an exercise that was completed by teachers at the MI Institute.

VIDEO GUIDE

SEGMENT 1: PAPER TOWER

WHAT TO EXPECT

Who: Dr. Terry Neu, MI Expert

What: Dr. Neu provides instructions for building a paper tower.

Where: MI Institute for NYC teachers

Why: To prepare you for an experiential building exercise

PLAY TAPE: PAPER TOWER INSTRUCTIONS
PAUSE TAPE

MATERIALS FOR EACH GROUP

- 20 sheets of 8 1/2" x 11" paper (plain printer or photocopy paper preferred)
- A roll of scotch tape
- At least 40 large hardback books (large textbooks or encyclopedias) slightly larger in area than 8 1/2" x 11"

ACTIVITY: BUILDING EXERCISE

SUGGESTED ACTIVITY TIME: 25 MINUTES

Try to discover what you can from doing this activity, even if at first you feel somewhat perplexed by the assignment. As you will see when you return to the next video segment, all groups built structures with no more instructions or coaching than you have at this moment.

Build your own paper tower:

Design and build a structure with paper on which you can stack several large text books or encyclopedias. The structure must be 11 inches high and cannot be wider or longer than the 8 1/2" x 11" sheet of paper. You might try to test various design ideas before you settle on the one you think is best. Make a prediction about how many books you can stack on top of your structure.

Once the paper tower is built, stack books on it. Keep adding books to the stack until the structure collapses. Take note of possible problem areas in the structure as you add books.

When your structure collapses under the weight of the books, play the next part of the video, "Results from the MI Institute."

WHAT TO EXPECT

Who: Dr. Terry Neu, MI expert

What: Dr. Neu helps teachers analyze why their structures failed.

Where: Same as in previous segments

Why: To learn more from this activity

PLAY TAPE: RESULTS FROM THE MI INSTITUTE
PAUSE TAPE FOR ACTIVITY

SUGGESTED TIME: 5 MINUTES

From an engineer's perspective, it is necessary to hypothesize about what was wrong with the structure and how to rebuild it, which would be communicated through a damage report. Using this perspective, hypothesize about what was wrong with *your* structure and how to rebuild it so it holds more books. Refer to the box below. For example, ask:

- What do the columns look like after the structure fails?
- Where are the buckling points?
- Did the columns twist? Why might that be?
- What appear to be the main reasons why your structure failed? (A damage report prepared by an engineer would need such answers.)

Physical concepts and forces as they apply to structures

STABILITY: Engineering. A measure of the ability of a structure to withstand overturning, sliding, buckling or collapsing.

BALANCE: Equal distribution of weight; state of equilibrium.

STRENGTH: The capacity to resist a force (such as the force of Gravity)

LOAD: Physics. The weight that is supported by a force which a structure is calculated to oppose, comprising an unmovable and unvarying force; the quantity that must be or usually is carried.

TORQUE: Engineering. That which produces or tends to produce torsion or rotation. Physics. Turning or twisting energy measured as a product of a force. The product of a force and its perpendicular distance from a point about which it causes rotation.

WHAT TO EXPECT

Who: Umar Abdul Wali

What: Mr. Wali states key elements of an MI approach to understanding

Why: Provide context for examples that follow

PLAY TAPE: MI APPROACH TO UNDERSTANDING
PAUSE TAPE TO REVIEW KEY POINTS

To deepen understanding we need to:

- define the big ideas we want students to explore or study or understand
- allow for a variety of perspectives or entry points to explore these ideas
- assess students' understanding of these ideas by offering opportunities for them to demonstrate their understanding using more than one symbol system or intelligence (i.e., being able to represent understanding using spatial, logical-mathematical, and linguistic symbol systems; for example, a well-written damage report with diagrams)

DISCUSSION: TEST YOUR UNDERSTANDING

SUGGESTED TIME: 5 MINUTES

In what ways did using the engineer's perspective, and building the paper tower as an entry point, give you a deeper understanding of the physical concepts and forces at work (stability, balance, strength, load, torque)?

To elaborate on the nature of understanding, use these clues to understanding:

Did this activity invite...

- Careful attention/observation?
- Linking to prior knowledge (your own or other's)?
- Using language of the discipline?
- Expressing your understanding using more than one symbol system (i.e., being able to represent understanding using spatial, logical-mathematical, and linguistic symbol systems)?
- Seeking additional information and other ways to deepen understanding?

SEGMENT 2: POPULATION DYNAMICS
(Adapted from Project Wild, permission pending)

WHAT TO EXPECT

Who: Dr. Terry Neu, Science Educator and MI Expert

What: Dr. Neu conducts an experiential exercise

Where: MI Institute

Why: To demonstrate an alternative entry point (and an ecologist's perspective) in connection with concepts related to population dynamics.

WHAT TO FOCUS ON

How does this activity allow deeper understanding of these concepts?

CONCEPTS

- Good habitat is the key to wildlife survival.
- A population will continue to increase in size until some limiting factors are imposed.
- Limiting factors contribute to fluctuations in wildlife populations.
- Nature is never "in balance," but is constantly changing.

PLAY TAPE
PAUSE TAPE FOR DISCUSSION

SUGGESTED TIME: 5 MINUTES

1. In what ways does this activity tap the following intelligences: linguistic, bodily kinesthetic, interpersonal, and intrapersonal, logical-mathematical, and naturalist?

2. How does this activity allow deeper understanding of the key concepts identified above?

WHAT TO EXPECT: MAKING CONNECTIONS

Who: Teachers

What: Discuss how they might use this simulation

Where: MI Institute for NYC educators

Why: To consider applications to their own curriculum

PLAY TAPE

PAUSE TAPE

DISCUSSION

SUGGESTED TIME: 5 MINUTES

1. What other perspectives or entry points can be used to explore population dynamics concepts? Concepts might include the relationship of supply and demand, the study of adaptation, the potential effect of pollution or global warming as a "limiting factor." Perspectives might include artistic, statistical, historical, dramatic, or sociological. Appropriate entry points might include science experiments, stories, plays.

2. Briefly discuss ways you might connect the "Oh Deer!" simulation to your curricula. [See "Oh Deer!" activity in the Units, Lessons, and Tools section of this module.]

After this discussion, review the planning guide on the following page.

INTERIM ACTIVITIES

Below are guiding questions to help you plan your use of MI theory to promote in-depth understanding. Consider these questions and discuss your plans with your colleagues before moving on to the next session.

Planning Guide
(Adapted from Baum et al, in press)

1. Which key concepts, generative ideas and essential questions do I want my students to understand over the year? Choose a particular subject area, unit, or project. List a few below.

2. What activities can I use as entry points to convey big ideas and build a rich knowledge base? Consider relevant perspectives. (For example, what would intrigue a mathematician or artist if she were studying this era or topic?)

3. Do these activities allow my students to examine topics from a variety of perspectives or disciplines? If not, what can I add?

4. Which of my ideas will best align with my targeted concepts? Note multiple entry points and perspectives below.

5. Do the activities allow for the application and representation of the ideas in more than one symbol system or intelligence for assessment purposes? Describe below.

YOUR NOTES

SEGMENT 3: JOAN GEISMAN'S 3RD GRADE

BACKGROUND

Ms. Geisman has developed several opportunities for her students to deepen their understanding of adaptation, using herpetology (the study of reptiles and amphibians) as a disciplinary framework. The unit offers several weeks of hands-on and experimental activities. Throughout, Ms. Geisman offers multiple entry points, inviting students to deepen their understanding as they bring their own perspectives and combinations of intelligences to their work. You will find her unit plan and today's lesson in Units, Lessons, and Tools.

WHAT TO EXPECT

Who: Joan Geisman

What: Ms. Geisman uses multiple entry points and perspectives to teach complex concepts in unit on adaptation.

Where: Lower East Side School, District 1

Why: To demonstrate multiple entry points and perspectives (note: "perspective" refers to tasks and symbol systems commonly associated with formal disciplines or domains, such as herpatology)

WHAT TO FOCUS ON

Use the form on the next page to note three things: multiple perspectives, entry points, and examples of behaviors that suggest students are deepening their understanding. You may focus on one or more students in each group, or play each segment more than once.

Ms. Geisman wants her students to deepen their understanding of the following concepts:

- All animals are adapted by nature to allow them to survive in their environment.
- Environmental conditions change, and animals adapt to that change or face extinction.
- How animals breathe, find food and water, protect themselves, and reproduce are essential adaptations for survival.

PLAY TAPE: FIRE BELLY NEWTS
PAUSE TAPE

DISCUSS

- What perspectives do you observe?
- What student behaviors suggest their growing understanding?

PLAY TAPE: LEOPARD FROGS
PAUSE TAPE

SUGGESTED DISCUSSION TIME: 5 MINUTES

DISCUSS

- What perspectives do you observe?
- What student behaviors suggest their growing understanding?

Remember your clues to understanding:

- Careful attention and observation
- Linking to prior knowledge
- Using language of the discipline
- Expressing understandings using more than one symbol system
- Seeking other ways to deepen understanding

PLAY TAPE: TURTLES
PAUSE TAPE

SUGGESTED DISCUSSION TIME: 5 MINUTES

DISCUSS

- What perspectives do you observe?
- What student behaviors suggest their growing understanding?

CONCEPTS

- All animals are adapted by nature to allow them to survive in their environment.
- Environmental conditions change, and animals adapt to that change or face extinction.
- How animals breathe, find food and water, protect themselves, and reproduce are essential adaptations for survival.

PLAY TAPE: LEARNING WITH COMPUTERS
PAUSE TAPE

SUGGESTED DISCUSSION TIME: 5 MINUTES

DISCUSS

- What perspectives do you observe?
- What student behaviors suggest their growing understanding?

WHAT TO EXPECT

An MI assessment approach, from Gardner's perspective

Who: Mr. Wali

Why: Keep MI in mind as a tool for developing assessments of understanding

PLAY TAPE: ASSESSING UNDERSTANDING
PAUSE TAPE FOR DISCUSSION

SUGGESTED TIME: 5-10 MINUTES

Assessment focus, from Gardner's perspective, requires students to:

•demonstrate ability to apply concepts to a new situation or context; and

•represent understanding using more than one symbol system

Apply these suggestions as you discuss:

1. In what ways might Ms. Geisman assess her students' understanding of adaptation concepts?

2. How might you incorporate Gardner's assessment focus to gain a sense of your students' understanding of complex concepts?

SEGMENT 4: SUMMARY OF MODULE IV

WHAT TO EXPECT

Who: Mr. Wali

Why: Review key points

PLAY TAPE

END TAPE. REVIEW KEY POINTS

SUGGESTED TIME: 2 MINUTES

There are three principle reasons to use an MI approach to deepen understanding:

- More students will be able to gain a understanding of key concepts through multiple entry points and perspectives;
- When teachers represent knowledge in multiple ways, students see what it takes to have a deeper understanding of a concept;
- Offering students multiple ways to express their understanding will be comfortable for them and accessible to others.

YOUR NOTES

UNITS, LESSONS, AND TOOLS

ENGINEERING: PAPER TOWER ACTIVITY

(adapted by Terry Neu)

This lesson offers an engineering perspective to gain understanding of the following physical forces.

STABILITY (Engineering) A measure of the ability of a structure to withstand overturning, sliding, buckling, or collapsing.

BALANCE An equal distribution of weight; steady state or equilibrium.

STRENGTH The capacity to resist a force (such as the force of gravity)

LOAD (Physics) The weight that is supported by a structure. Any forces that a structure is calculated to oppose. Comprising an unmovable and unvarying force. The quantity that must be or usually is carried.

LOAD STRESS (Physics) A force that results from a pressure.

LOCAL BUCKLING Collapse of the elements of a column section in a series of waves or wrinkles

TORQUE (Engineering) That which produces rotation.
(Physics) Turning or twisting energy measured as a product of a force. The product of a force and the force's perpendicular distance from a point about which it causes rotation.

PERSPECTIVES, INTELLIGENCES

- Paper constructions: Engineering perspective: bodily kinesthetic, spatial, logical-mathematical
- Testing for stability and strength: Engineering: bodily kinesthetic, spatial, logical-mathematical
- Analyzing and interpreting data: logical-mathematical
- Collaboration: interpersonal intelligence
- Writing a damage report: linguistic

MATERIALS

- A stack of 8 1/2" x 11" sheets of paper (laser printer paper would be good) in sufficient quantity so each group (of 4 or 5) receives 20 sheets
- One roll of scotch tape for each group
- At least 50 hard cover books, such as a set of encyclopedia or textbooks

TIME

For a class of 30, allow 20 minutes for part 1 (design, test, build); 20 minutes for part 2 (stack books, analyze failure); and 20 minutes to write damage report, depending on amount of additional information to be researched and included.

PART 1

1. Divide the class into engineering teams of 4 to 5 students and distribute 20 sheets of paper and one roll of tape to each group.
2. Give assignment: Each team will design and build a structure which must be 11" high and cannot be wider or longer than an 8 1/2" x 11" sheet. Once the structure is built, the team will pile books on it until the structure collapses.

3. Suggest that each team test their structure by applying weight, such as books, at different stages as they plan and build.
4. Before they do their final stacking of books, someone on the team should sketch the design for future reference.

It is important to visit all teams while they work.

SCAFFOLDING SUGGESTIONS

- Listen in on groups' design discussions.
- Focus and reinforce efforts to test design ideas.
- Encourage groups to sketch their ideas.
- Bring in applicable principles as they emerge from the work of the group. For example, if the group is being careful to alternate spines as they stack books, mention that it appears they are correctly applying the principle of balance in assuring an equal distribution of weight. Or, when someone suggests that they make columns stronger by using two or more sheets, reinforce the idea by saying, "You're correct to think about the strength of the individual columns to withstand the weight of the books."

After each team has worked for a few minutes, ask them to make a prediction about how many books their structure will hold. Also, make everyone aware of safety issues. With ten or more books in a stack, it could be dangerous when the structure fails.

PART 2

1. As each book is added to the stack, team members should carefully observe the structure to see if and where the stress points appear to be.
2. When the structure finally fails, the team members hypothesize what was wrong with the structure and how they may rebuild it to make it hold more books.
3. Ask: What do the columns look like after the structure fails?
   Where are the load buckling points?
   Did the columns twist? Why might that be?
   What appear to be the main reasons for the structure's failure?
4. A damage report is written, which includes a hypotheses regarding what went wrong and how the structure could be improved. The damage report should make reference to any of the physical forces defined above.

ECOLOGY: POPULATION DYNAMICS: "OH DEER!"

(Project Wild, permission pending)

This lesson offers an ecologist's perspective to gain understanding of the following concepts:

•Good habitat is the key to wildlife survival.

•A population will continue to increase in size until some limiting factors are imposed.

•Limiting factors contribute to fluctuations in wildlife populations.

•Nature is never in balance, but is constantly changing.

PERSPECTIVES, INTELLIGENCES

Using the ecologist's perspective, students "become" deer and other components of habitat in a highly involving physical activity.

- Physical simulation involves bodily kinesthetic and personal intelligences.
- Analysis of fluctuations in wildlife populations involves logical-mathematical and linguistic intelligences.
- Understanding and communicating the importance of limiting factors and fluctuations in wildlife populations requires linguistic and naturalist intelligences.

MATERIALS

- area: either indoors or outdoors—large enough for students to run, e.g., playing field
- chalkboard or chart
- writing materials

BACKGROUND

A variety of factors affect the ability of wildlife to successfully reproduce and to maintain their populations over time. Disease, predator/prey relationships, varying impact of weather conditions from season to season (e.g., early freezing, heavy snows, flooding, drought), accidents, environmental pollution and habitat destruction and degradation are among these factors.

Some naturally caused as well as culturally induced limiting factors serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support. An excess of such limiting factors, however, leads to threatening, endangering, and eliminating whole species of animals.

The most fundamental of life's necessities for any animal are food, water, shelter and space in a suitable arrangement. Without these essential components, animals cannot survive.

This activity is designed for students to learn that wildlife populations are not static. They continuously fluctuate in response to a variety of stimulating and limiting factors. We tend to speak of limiting factors as applying to a single species, although one factor may effect many species.

Natural limiting factors are those modeled after factors in natural systems, and tend to maintain populations of species at levels within predictable ranges. This kind of balance in nature is not

static, but is more like a teeter-totter. Some species fluctuate or cycle annually. Quail, for example, may start with a population of 100 pair in early spring, grow to a population of 1200 birds in late spring and decline slowly to a winter population of 100 pair again. This cycle appears to be almost totally controlled by the habitat components of food, water, shelter, and space, which are also limiting factors. Habitat components are the most fundamental and thereby the most critical of limiting factors in most natural settings.

This activity is intended to be a simple but powerful way for students to grasp these basic concepts: everything in natural systems is interrelated; populations of organisms are continuously effected by elements of their environment; populations of animals do not stay at the same static number year after year in their environment, rather they are continually changing in a process of maintaining dynamic equilibria in natural systems.

PROCESS

1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things animals need in order to survive. Review the essential components of habitat with students: food, water, shelter, and space in a suitable arrangement. This activity emphasizes three of four habitat components—food, water, and shelter. The students should not forget the importance of animals having sufficient space in which to live and that all the components have to be in a suitable arrangement or the animals will die.
2. Ask your students to count off in fours. Have all the "ones" go to one area; all the "twos," "threes" and "fours" go together to another area. Mark two parallel lines on the ground or floor 10–20 yards apart. Have the ones line up behind one line; the rest of the students line up behind the other line.
3. The ones become deer. All deer need good habitat in order to survive. Ask the students what the essential components of habitat are again: food, water, shelter, and space in a suitable arrangement. For the purposes of this activity, we will assume that the deer have enough space in which to live. We are emphasizing food, water, and shelter. The deer (the ones) need to find food, water, and shelter in order to survive. When a deer is looking for food, she should clamp her hands over her stomach. When she is looking for water, she puts her hands over her mouth. When she is looking for shelter, she holds her hands together over her head. A deer can choose to look for any one of these during each round of the activity; the deer cannot, however, change what she is looking for; e.g., when she sees what is available during a round. She can change what she is looking for in the next round, if she survives.
4. The twos, threes, and fours are food, water, and shelter—components of habitat. Each student gets to choose at the beginning of each round which component he or she will be during that round. The students depict which component they are in the same way the deer show what they are looking for; that is, hands on stomach for food, etc.
5. The activity starts with all players lined up on their respective lines, deer on one side and habitat components on the other side, and with their backs to the students at the other line.
6. The facilitator or teacher begins the first round by asking all of the students to make their signs—each deer deciding what it is looking for, each habitat component deciding what it is. Give the students a few moments to get their hands in place—over stomachs, mouths, or over their heads.

As you look at the two lines of students, you will normally see a lot of variety—with some students choosing water, some food, some shelter. As the activity proceeds, sometimes the students confer with each other and all make the same sign. That's okay, although don't encourage it. For example, all the students in habitat might decide to be shelter. That could represent a drought year with no available food or water.

If students switching symbols in the middle of a round is a problem, you can avoid that by having stacks of three different tokens, or pieces of colored paper, to represent food, water and shelter at both the habitat and deer ends of the field. At the start of each round, players choose one of the symbols before turning around to face the other group.

7. When you can see that the students are ready, count: "One, two, three." At the count of three, each deer and each habitat component turns to face the opposite group, continuing to hold their signs clearly.
8. When deer see the habitat component they need, they are to run to it. Each deer must hold the sign of what it is looking for until getting to the habitat component person with the same sign. Each deer that reaches its necessary habitat component takes the "food," "water," or "shelter" back to the deer side of the line. This represents that the deer is successfully meeting its needs, and successfully reproducing as a result. Any deer that fails to find its food, water, or shelter dies and becomes part of the habitat. That is, in the next round, the deer that died is a habitat component and so is available as food, water, or shelter to the deer that are still alive.

When more than one deer reaches a habitat component, the student who gets there first survives. Habitat components stay in place on their line until a deer needs them. If no deer needs a particular habitat component during a round, the habitat component just stays where it is in the habitat. The habitat person can, however, change which component it is from round to round.

9. You, as the facilitator or teacher, keep track of how many deer there are at the beginning of the activity, and at the end of each round you record the number of deer also. Continue the activity for approximately 15 rounds. Keep the pace brisk and the students will thoroughly enjoy it.
10. At the end of the 15 rounds, gather the students together to discuss the activity. Encourage them to talk about what they experienced and saw. For example, they saw a small herd of deer (seven students in a class size of 28) begin by finding more than enough of its habitat needs. The population of deer expanded over two to three rounds of activity until the habitat was depleted and there was not sufficient food, water, and shelter for all the members of the herd. At that point, deer starved or died of thirst or lack of shelter, and they returned as part of the habitat. Such things happen in nature also.

In real life, large mammal populations might also experience higher infant mortality and lower reproductive rates.

11. Using a flip chart or a chalkboard, post the data recorded during the

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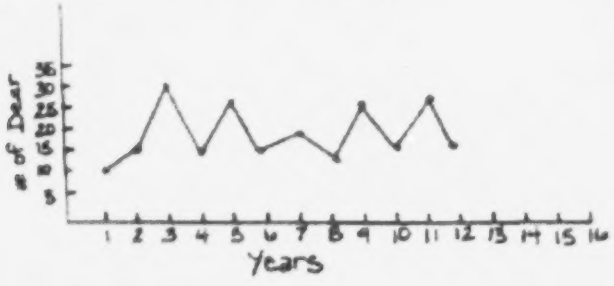
activity. Include the number of deer at the beginning of the activity, and at the end of each round represent the number of deer in a series of years. That is, the beginning of the activity is year one; each round is an additional year. Deer can be posted by fives for convenience. For example:



The students will see this visual reminder of what they experienced during the activity: the deer population fluctuated over a period of years. This is a natural process as long as the factors that limit the population do not become excessive, to the point where the animals cannot successfully reproduce. The wildlife populations will tend to peak, decline, and rebuild, peak, decline, and rebuild—as long as there is good habitat and sufficient numbers of animals to successfully reproduce.

12. In discussion, ask the students to summarize some of the things they have learned from this activity. What do animals need to survive? Are wildlife populations static, or do they tend to fluctuate, as part of an overall "balance of nature?" Is nature ever really in "balance" or are ecological systems involved in a process of constant change?

VARIATIONS

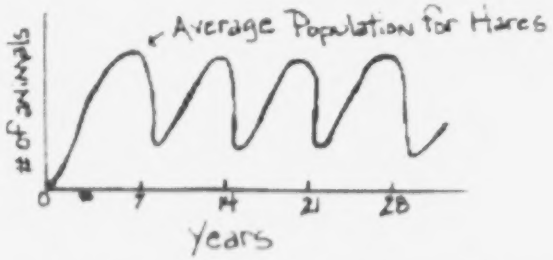
1. After the students have played several rounds of "Oh Deer!" introduce a predator such as a mountain lion or wolf into the simulation. The predator starts in a designated "predator den" area off to the side. The predator has to skip or hop, to reduce the possibility of violent collisions between deer and predators. The predator can only tag deer when they are going towards the habitat and are between the habitat and deer lines. Once a deer is tagged, the predator escorts the deer back to the predator den. That simulates the time it takes to eat. The "eaten" deer is now a predator. Predators that fail to tag someone die and become habitat. That is, in the next round, the predators that died join the habitat line. They will become available to surviving deer as food, water or shelter. During each round, the teacher should keep track of the numbers of predators as well as the number of deer. Incorporate these data into the graphs.
2. Instead of drawing the line graph for students as described in procedure 11, have the students create their own graphs. Provide them with the years and numbers of deer. Depending on the age group, they can make picture, line or bar graphs.

EXTENSIONS

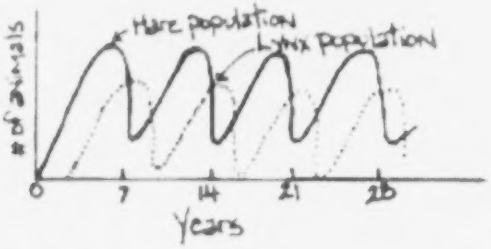
When you have finished tabulating and discussing the graph data, ask the students if they have ever heard of the Hudson Bay trappers in American history. Tell them briefly who they were.

There are a hundred years or more of records of the activities of these trappers. In those records are some interesting data. These data refer to pelts shipped from America to Europe, particularly the pelts of snowshoe hares and lynx. Researchers have found that snowshoe hare populations seem

to peak about every seven to nine years and then crash, repeating the process over each comparable time period. So, a snowshoe hare population graph would look like this:



It has also been discovered that lynx populations do the same thing—except that they do it one year behind the hare populations. The combined graph would look like this:



Graph this right over the deer graph that you made, adding first the hares, and then the lynx. Ask the students:

- Which animal is the predator? Which is the prey?
- Are predators controlling the prey, or are prey controlling the predators? (We have been brought up to "know" that predators control the prey—and are now discovering that this is not so. The number of prey animals available tells us how many predators can live in the area.)

Is this like the deer habitat activity we just played? What controls population sizes? Sometimes the habitat—when the deer population "gets on top of it" and destroys the vegetative food and cover.

Recent research has added a new dimension to the story of the snowshoe hares and the lynx. It has been found that a major winter food of the hare is a small willow. As hare populations grow, the willow plant has been "hedged" or eaten back so far that the plant generates toxin (poison) which precludes use by the hare. That is when the hare population crashes, followed by the crash of the lynx population about a year later. Then the willow, relieved of pressure, begins to grow again. The hare population begins to grow in response, and last of all, within a year or so, the lynx population follows. And the cycle has begun again—over and over—every seven to nine years.

Discuss the balance of nature. Is it ever in balance?

AQUATIC EXTENSION

Do the activity in exactly the same fashion, except substitute an aquatic species of wildlife. In this case, assume all the water is available but space is needed, as is food and shelter. Hands on stomach is food, hands together over head is shelter, and arms out to the side is space. The objective remains the same, except that now you are identifying food, shelter, and space as three essential components of habitat. Examples of possible aquatic species: manatee, salmon, frog, etc.

ADAPTATION

(Developed by Joan Geisman, Lower East Side School, District 1)

DISCIPLINE: SCIENCE (3RD GRADE)

Herpetology is the present context for the study of adaptation. The activities that follow use herpetology as a discipline through which understanding of adaptation will emerge.

CONCEPTS

- All animals are adapted by nature to allow them to survive in their environment.
- Environmental conditions change, and animals adapt to that change or face extinction.
- How animals breath, find food and water, protect themselves, and reproduce are essential adaptations for survival.

MATERIALS

- 6 tanks with various reptiles and amphibians, including aquatic turtles (red-eared sliders), Carolina anoles, a garter snake, leopard frogs, fire belly newts, frog spawn (hatching into tadpoles)
- Appropriate food for each animal
- Groliers 1999 Interactive Encyclopedia CD for computer
- 2 baskets of books, one on reptiles and one on amphibians. Books are on a wide range of reading levels. Many are from the school library, and many were ordered through the NYSTL library.
- Science folders, one for each student, where they keep their observations, illustrations, and research
- Materials for recording observations and research: pencils, colored pencils, markers, lined paper, and drawing paper
- Magnifying glass, handheld, for close observation
- Herpetology vocabulary sheet includes:

Herpetology	Reptiles
Amphibians	Vertebrates
Ectothermic	Scales
Adaptation	Hibernate
Food chain	Population
Predator	Prey
Camouflage	Metamorphosis
Tadpole	Spawn

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INTRODUCTION TO HERPETOLOGY

a) Herpetology is the study of reptiles and amphibians. What do we know about reptiles and amphibians?

b) Start a "K—W—L—H" Chart [What I Know, What I Want to Know, What I Learned, How I Learned It

c) How do herpetologists work?

ENTRY POINTS

- We will observe reptiles and amphibians in our classroom.
- We will read a number of books and magazines from our classroom library, our school library, and the public library.
- We will use reference materials—dictionaries, encyclopedia, and the CD ROM encyclopedia on our computer (Grolier Interactive 1999).
- We will research websites on the Internet.
- We will go to the Bronx Zoo twice. The first visit will be a program in the Education Department (Sydelle Schein, director) conducted by zoo herpetologists, who will introduce us to the work that is done in the zoo in herpetology. The second visit we will spend in the House of Reptiles and Amphibians, where we will do our research.
- We will go to the American Museum of Natural History to visit the Hall of Reptiles and Amphibians (3rd floor) to continue our research.
- We will go to the Central Park Zoo to meet with a herpetologist from the Urban Park Rangers who will tell us about reptiles and amphibians in NYC.
- We will view two films, one on reptiles and one on amphibians (Eyewitness Video Collection).
- Each of you will choose a research project for a presentation. The topic and the project will be of your own choosing. There are a wide variety of materials and media you can use for your project.

EXPLORATION ACTIVITIES

Scientific [Naturalist] Perspective (naturalist intelligence; associated intelligences: linguistic and interpersonal)

Observe the animals

Set up tanks

- Aquatic turtles (red-eared sliders)
- Carolina anoles
- New York garter snake
- Tadpoles (from Carolina Biological Supply)
- Leopard frogs
- Fire Belly newts
- Frog spawn

All animals listed are indigenous to the New York City area and are easier to acquire and keep alive than more exotic species.

Daily observation times are set up when the children can observe the animals and record and share their observations. Groups of no more than 4 or 5 allow children to talk and construct knowledge through their collaboration. If a child want to work alone it's alright, but small-group collaborative model of inquiry is most successful.

a) General Observations. Look at the animals carefully. What do you notice? What questions do you have? Record and share with the entire group.

b) Focused Observations. Look at the animal carefully and observe it for a specific reason:

- Watch it eat
- Watch it move
- Look at the head and eyes
- Look at and feel the skin
- How do the turtles and anoles and newts interact with one another?
- How do they react to light? Lack of light?

Use classroom observations, research, and trips to apply the concept of adaptation to the study of these animals.

CLASSROOM RESEARCH

- Show two videos, one each day: "Eyewitness Reptiles" and "Amphibians." Put them in the lending library.
- Use videos and books on reptiles and amphibians to answer questions. Also create chart of "Reptiles are..." and "Amphibians are..."

FIELD RESEARCH

- Museum visit
- Two Bronx Zoo visits

Perspectives

SCIENTIFIC PERSPECTIVE

(associated intelligences: naturalist, spatial, linguistic, logical-mathematical, and interpersonal)

COMPUTER-BASED RESEARCH PERSPECTIVE

(associated intelligences: spatial, bodily kinesthetic, interpersonal, intrapersonal)

Some students will engage in computer-based learning over and above any other media; we speculate that the graphic (spatial) and bodily kinesthetic options, combined with the learner-centered features (intrapersonal) are responsible for this preference.

- Use Internet, interactive encyclopedia to study herpetology, adaptive traits, and population dynamics.

VISUAL ARTS PERSPECTIVE

(associated intelligences: spatial and bodily kinesthetic)

Students draw studies of feeding reptiles and amphibians to illustrate how nature has adapted their bodies to catch flies.

ECOLOGISTS PERSPECTIVE

(associated intelligences: naturalist, linguistic, interpersonal, logical-mathematical, bodily kinesthetic)

- Read NYC Reptiles from Wild New York. Read student printout.
- Visit Central Park herpetologist with questions based on observations and previous research, i.e., what special adaptations are necessary for reptiles and amphibians living in NYC? Which animals have died out and why? What are urban park rangers doing to protect our reptile and amphibian species?

STATISTICAL PERSPECTIVE

(associated intelligences: logical-mathematical and bodily kinesthetic)

- Animal Population Game [see "Oh Deer"] using American Bull Frogs, Box Turtle, Eastern Terrapin Turtle, Black Rat Snake
- Keep track of the increase and decrease in the populations and record it on a graph.

BIOLOGIST/ECOLOGIST PERSPECTIVE

(associated intelligences: naturalist, spatial, logical-mathematical, and linguistic)

- Food chains activity
- How do the animals we study get food and provide food for their predators?
- Can you draw a food chain? Who is at the top of your food chain and who is at the bottom? What would happen if one animal species on your food chain became endangered? How would it affect others?

FINAL PROJECTS TO DEMONSTRATE UNDERSTANDING

- Oral presentation
- Written presentation
- Hyperstudio Stack on IBM
- Illustrations
- Diagrams or graphic organizers
- Map with explanation
- Movement piece
- Clay or papier mache models

ASSESSMENT

[See template at back of this module.] Performance-based assessment of the student's understanding of the basic educational objectives of the unit. For example, how well do they understand one or more stated concepts?

VIDEOTAPED LESSON: ADAPTATIONS BY REPTILES AND AMPHIBIANS

(Joan Geisman, Lower East Side School, District 1)

MOTIVATION

Teacher walks in an exaggerated way through a group of students and says, "I am a human and I have these wonderful legs. They help me to get around and walk in my natural habitat. If I lived in water and had to move through water, do you think my legs would work well?" "Why or why not?" "What do I do with my legs when I want to move through water?"

INTRODUCE CONCEPT

Our bodies are designed to move on earth. The fish's body is adapted to move in the water. We call the ways in which our bodies are made to survive in our natural habitat "adaptations." We say the human body is adapted to move on land in an upright position by the use of legs. Our legs are an adaptation. Another adaptation we have is our lungs. We are adapted to breathe air through our lungs.

You have been observing the animals very carefully. I want to look today for reptile and amphibian adaptations. Some of you will observe the animals in the tanks. Some of you will look up reptiles and amphibians in the Grolier Encyclopedia at the computer and some will use books in our classroom library on reptiles and amphibians.

I want you to look for and record some ways in which the animal you are observing or researching is adapted by nature to survive in its natural habitat. You may look at adaptations that help the animal to breathe, find food and water, protect itself, and reproduce. You may work alone or collaboratively. Please record your work. You may write, illustrate, or report orally and you may do so alone or together. When we finish we will share what we have learned.

SMALL GROUP OR INDIVIDUAL WORK

ALLOW 30—40 MINUTES

Study centers are listed and children choose where they would like to work. There can be 3-4 observers at each tank, 2-3 at the computer, and 6 at the books. Teacher keeps the focus on adaptations.

Focus questions for students:

- What is the adaptation the child is researching?
- Why would nature adapt the animal in this particular way?
- How would that aid the animal to survive, thrive, and reproduce?
- How and why is this particular reptile or amphibian adapted similarly or differently from another animal?
- How is the body structured?
- Where are the eyes, ears, legs?
- What does the skin look and feel like?
- How does it move, eat and breathe?

- For what purpose is the body adapted?
- Why is the animal adapted to behave in that way?

SCAFFOLDING SUGGESTIONS TO BUILD AND ASSESS UNDERSTANDING

(to be used during and after students' observations)

Focus students on what and how they will share what they learned using questions like these:

- Can you describe the way the eyes are situated on the frog's head?
- Can you illustrate the scales on the anole's skin?
- Can you demonstrate with your arms and legs what turtles do with their arms and legs as they move through the water?
- Can you use a Venn diagram to show how two of the animals you've studied are adapted alike and differently and try to explain why?
- Have you thought of any questions to ask the herpetologist from the Urban Park Rangers when we see her?

DISCUSSION

Groups gather in the meeting area and the children who wish to share what they learned with the group may do so. If anyone does not wish to share today, they can give their work to the teacher and share with her.

FOLLOW-UP

Three trips in next five weeks: Bronx Zoo Reptile and Amphibian House, Hall of Reptiles and Amphibians at the Museum of Natural History, and Central Park program on reptiles and amphibians conducted by Lynn Williams, a herpetologist with the Urban Park Rangers

Students will bring trip sheets to record their observations [they each choose one animal in the exhibit and tell at least two ways in which nature has adapted that animal to survive in its natural habitat. On the third trip children will bring questions to the NYC herpetologist.

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Module V
MI THEORY AND PROBLEM-BASED LEARNING

OBJECTIVES

Apply MI theory by offering students opportunities

- to solve real-world problems and develop authentic products to take on the role of the practicing professional
- to incorporate basic skills acquisition into this type of learning experience

VIDEO GUIDE

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2	Jackie Flannigan's class	10
Units, Lessons, and Tools		15
Problem-Based Projects		
	Early Grades: Thunder Cake	16
	Middle School: The Pond Problem	19
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MI THEORY AND PROBLEM-BASED LEARNING

Problem-based learning is a natural partner of Multiple Intelligences theory, because students address real world problems and create authentic products. Giving students opportunities to take on the role of the practicing professional engages their multiple intelligences in ways authentic to the domain involved.

Problem-based learning is obviously not a new concept. John Dewey (1900) argued that schools should reflect the real world, where children would "learn by doing." He suggested progressive classrooms might resemble the community institutions where someday students would be employed. Authentic projects would allow children to come to know their world, achieve a fuller understanding of themselves and begin to secure a feeling for the skills and concepts that lay at the heart of formal disciplines.

Dewey's recommendations predate *Frames of Mind* (1983) by more than 80 years. Gardner provides a cognitive foundation for these recommendations, defining intelligence as the capacity to solve problems and create products valued by one or more cultures. As a meaningful application of MI theory, a problem-based approach invites students to use and develop their multiple intelligences in the ways that prepare them for thinking and lifelong learning as responsible, productive, creative members of their communities.

THE BASICS OF A PROBLEM-BASED APPROACH

Problem-based learning involves one or more projects or performances that reflect meaningful, complex work over time. This approach initially involves identifying one or more complex questions, challenges, or concerns relevant to students' lives. Students are an excellent source for identifying problems or issues that concern or fascinate them. Problems or projects often emerge from teacher/student conversations about the needs or concerns of the community or beyond. Teachers, of course, can suggest problems, gauging their content by the age and interests of students. Recent projects tackled by New York students include how to rid their school of mice, how to prevent children from getting hooked on cigarettes, and how to reduce the spread of AIDS.

Problems can evolve naturally from the curriculum itself. For instance, published, problem-based curricula can be purchased, and often such curricula are an excellent option. (One of the illustrations in this module uses a problem-based middle school science curriculum.) Purchased curricula with this underlying design element are constructed around problems with considerable substance. Such curricula help students acquire disciplinary concepts and strategies through "simulations." It is only a few small steps between these simulations and the daily problems, interests, or larger concerns that students knowingly will inherit from the adults in their communities.

Teachers can also identify real-world problems from their prescribed curricula. For instance, if a goal in mathematics is to understand ratios, students can take on a study of the ratio of students to teachers or police to citizens.

Whether problems are identified by the students and teachers or come from an off-the-shelf curriculum, the process always involves a layered approach. A problem-based approach activates a process enabling students to acquire knowledge of disciplinary methods, techniques, and strategies. Within the context of their projects students also learn and strengthen their basic skills. This *is* what standards-based curricula is about—preparing students for the authentic world.

Problems will raise questions, such as What curricular goals and basic skills naturally flow from the investigation process? and What knowledge and skills are necessary to create products that address

the problem in a meaningful way? Teachers also consider the kinds of professional roles students need to assume and what kinds of strengths are needed for each role. Teachers might also develop and share an assessment matrix with their students, based on questions like How effective is this solution?; What is the quality of the final product and performances?; and To what extent do final products and performances demonstrate targeted skills?

PROBLEM-BASED LEARNING REQUIRES DIVERSE STRENGTHS

Students learn that solving real problems and creating authentic products is a process that requires diverse strengths and skills. As "practicing professionals," students take on several roles, working together by relying on one another's talents and contributions to both solve the problem and communicate results. In this way, students not only learn from one another, but also learn to value each other's unique abilities.

THE VIDEO ILLUSTRATIONS

This module will illustrate two different but equally effective examples of a problem-based approach. The first video illustration provides a snapshot of a middle school science program based on a yearlong curriculum called "Issues, Evidence and You" from Science Education for Public Understanding (SEPUP). Students learn and apply concepts, processes, and techniques of scientists as they address real-world issues important to them as individuals and as members of their communities.

In the second video illustration, a fourth-grade teacher uses an authentic project aimed at understanding the school and community over time. Called "Then and Now," this project coincides with a school-wide theme and a year-long curricular focus on American immigration. In the process, students assume the roles and learn and practice the skills needed by anthropologists as they study their community, and by multimedia producers as they develop a website.

In both examples, the teachers adapted a long-term project approach, and allowed for multiple entry points as well as multiple roles, enabling their students to learn by doing, within the context of specific disciplines.

MI, STUDENT ASSESSMENT, AND PROBLEM-BASED CURRICULA

The connections between MI theory and performance standards are further clarified in light of a problem-based curriculum. Gardner reminds us that intelligence is the capacity to solve problems and create products valued by one or more cultures. Performance standards require students to develop and strengthen their knowledge and skills as learners and problem-solvers, demonstrating increasing ability to think clearly and communicate understandings and opinions in connection with challenging texts and issues of social concern. A problem-based approach is a natural partner in applying MI theory and helping students achieve high levels of performance in connection with the new standards.

VIDEO GUIDE

SEGMENT 1: MARIA ROSADO'S CLASS

BACKGROUND

Ms. Rosado and her colleagues found SEPUP and *Issues, Evidence and You* with the assistance of their district office. This curriculum tackles the problem of groundwater contamination. Prior to today's activity, these students have learned science concepts such as "solutions," "concentrations," and "chemical interactions." Students play the role of a pioneering scientist, Dr. John Snow, in a simulation about a deadly cholera outbreak in London in the 1850s. In this process, they are also learning writing skills in order to effectively communicate their findings.

WHAT TO EXPECT

Who: Maria Rosado and combined 6th-, 7th-, and 8th-grade students

What: Students prepare letters in connection with an 1850s cholera epidemic, an activity embedded in a curriculum published by the Science Education Public Understanding Program (SEPUP)

Where: Dual Language Middle School in District 3

Why: Illustrate teaching basic skills combined with science concepts, as one activity in a layered, problem-based simulation

FOCUS

As you watch, consider the following:

- What problems are the students tackling?
- Why is this activity *authentic*? What practicing professional's role are students assuming?
- What skills are students applying?

PLAY TAPE

PAUSE TAPE FOR READING AND DISCUSSION

SUGGESTED TIME: 15–20 MINUTES

To give you a more complete sense of this curriculum and the students' experience, please read the following documents.

Issues, Evidence and You, for grades 8 or 9, includes concepts, processes, and techniques of science relevant to the real-world experiences of students. The issues emphasized in the course—water usage and safety, materials science and disposal, energy, and environmental impact—are important to the students as individuals and as members of their local communities.

Issues, Evidence and You features an integrated assessment program based on both research and teacher input. Since the course and its embedded assessment system were developed concurrently, concepts, skills, and assessment are interwoven throughout the materials. The assessment provides information and feedback that is relevant, timely, and understandable to teachers, students, parents, and administrators.

Water Usage and Safety

In this first part of *Issues, Evidence and You*, students are introduced to important concepts, process skills, and approaches to evidence-based decision-making that they will use frequently throughout the course. For example, students explore concepts such as solutions, concentration, chemical interactions, risk assessment, and toxicity as they investigate issues of water chlorination, water quality, and groundwater contamination. They practice skills such as experimental design, analysis of results, and written and oral reporting of their experiences.These concepts, process skills, and decision-making approaches form a "toolbox" that students are expected to use as they explore issues in the next three parts of the course.

Materials Science

Students use the toolbox in this second part of the course as they investigate a variety of natural and invented materials. They investigate the properties of materials and the relationship between these properties and the uses for various materials. They explore the relationship between the use of resources and production of materials and their impact on the environment. Students investigate the complete "life cycle" of materials, including their disposal when they are no longer useful, and conclude this part of the course by developing an integrated waste management system for their community.

Energy

Issues regarding energy and its role in society are examined in this third part of the course. Students explore their own use of energy and relate their consumption to the efficiency of energy transfer. They examine alternative sources of renewable energy and apply what they have learned about chemicals, materials, and energy to design an energy-efficient and cost-effective car.

Environmental Impact

In this last part of the course, students use and synthesize concepts introduced earlier to make an apparently simple decision about building a factory on an imaginary island. Students manufacture white glue, a product made from readily available materials found on the island, and consider the problems involved with scaling up glue production. They consider the economic, environmental, political, and social issues as they prepare an environmental impact report for building the factory and learn that tradeoffs are involved at all levels of decision making.

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In District 3

Science Education for Public Understanding Program (SEPUP) is a diverse educational program directed towards middle school students highlighting science and it's use in the context of societal issues, so that learners experience the reality of science. Students collect and process scientific evidence and use it to make decisions. As a result, they begin to appreciate both the power and limitation of science. SEPUP does not teach students what decisions to make. Instead it provides the necessary knowledge and understanding so that they can more effectively make their own decisions as participating members of a free and democratic society.

Following is a middle school teacher's account of the results of using one of the SEPUP modules – "Investigating Groundwater: The Fruitville Story." Students role-play different members of Fruitville at a town meeting. Eight presenters discuss clean-up plans. Students consider the duality of their roles, as both citizens and advocates.

Dual Language Middle School

The assignment was outlined and the students had two weeks to prepare for a Town Meeting. Since this assignment was designed to serve as an assessment very little feedback was given to the students as they prepared their presentations. On June 10 and 11 the students at the Dual Language Middle School gathered for a Town Meeting. Students were out of their usual jeans and T-shirts and instead wore suits and professional outfits representing a city manager, a resident, a parent, a vice president, two engineers, an inventor and a community activist.

I was neither prepared nor could I have imagined how powerful that experience was for the students and for me as an educator. I sat in awe as I listened to the students (especially those who aren't usually prepared) argue their points using the information they had gathered the entire trimester and including outside research. They offered solutions for cleaning up contaminated wells and argued their points always offering support for their argument. The students had spent two months investigating ground water and pesticide contamination and this was the arena in which they were to show not only if they understood the concepts but could they apply them and argue using scientific data.

The curriculum was offered by District Three when the science teachers at Dual Language Middle School felt their program was lacking something. Students don't usually have an opportunity to explore science through real life situations. SEPUP's "Investigating Groundwater: The Fruitville Story" was introduced to us as a curriculum that provides educational experiences focusing on science and its interaction with people and the environment. It also promotes the use of scientific principles, processes and evidence in public decision making: the Town Meeting.

The activity is written so that it can be completed in a few class periods. I decided that this activity needed at least two weeks to prepare for not only in terms of the actual written work and research

but the preparation and presentation of materials. The activity calls for eight students to prepare as panelists and the rest of the class acts as observers and questioners. For two months the students had been working in groups and we discussed at length the positive effects of working in teams. It seemed that this activity should be prepared for in the same manner. I altered the curriculum to accommodate my teaching and students' learning styles. Students were allowed to choose their roles. The descriptions were posted and each student chose a role and wrote an explanation about how he or she best fit that particular role. Immediately students sat in teams to develop their presentations. The only guide the students were given was to work together, use their science journals, and to incorporate outside research when needed. We then discussed the qualities of an excellent presentation, the use of visual aids, and body language.

Every person in the team was responsible for being prepared to present. The student was not notified until the day before that he or she was chosen in order to ensure that everyone did his/her part. There were no arguments when I chose the students and I was pleased to see how much support and encouragement they offered one another. Those not presenting officially were responsible for developing questions and listening closely during the presentation to argue points. Although the students were frustrated at times they were ready for the challenge.

On the day of the Town Meeting I had a luncheon ready for the class. I wanted to thank them for their hard work and energy and to make them feel professional. Name tags were prepared with their titles and affiliations. They were dressed for their positions and armed with visual aids and well practiced presentations. I felt that this presentation needed to be in the auditorium, as a real small town meeting would take place. I had on stage two long tables with eight seats. There were glasses of water and large nameplates for each presenter. Many students made posters, flyers and also made use of the overhead projector. The community activists had protesters in front of the auditorium to meet the people as they entered the auditorium. Everyone was in his or her role and taking the whole event very seriously.

The students wrote reflections about the town meeting experience. They felt it was one of the proudest moments they had had in a class even if they didn't present themselves. They also felt really proud of the teamwork they developed. One of the rules established during the town meeting during the question and answer period was that a panelist was allowed to ask for support from a team member. The students said this helped them feel confident on the stage. The students also realized that it wasn't until they were forced to put it into words that they really understood how all the investigations tied into the event. They also realized that a community must work together and how opinions may differ but what's best for the town must prevail. One student even said, "I felt like I was really a resident of Fruitville and I was getting really upset in the meeting, like this was real."

The teachers at Dual Language struggle to help students make connections from the classroom to the real world. The Town Meeting experience taught students that science and community are connected. They were able to be investigators and then translate that into policy making. This was true goal of SEPUP's Town Meeting activity that was successfully met by the students.

Teacher: Maria Rosada DLMS Director: Irma Marzan

SEGMENT 2: JACKIE FLANNIGAN'S CLASS

BACKGROUND

Ms. Flannigan and her colleagues at the Island School selected a school-wide theme, "Then and Now," to offer their students a deeper sense of connection to the history of their school and the significance of contributions made by the numerous immigrant groups whose lives and struggles have defined their Lower East Side community. Ms. Flannigan has a particular interest in and knowledge of Web technology, and one audience for her students' anthropological research will be anyone who visits the Island School's Web site.

WHAT TO EXPECT

Who: Jackie Flannigan and her 4th-grade students

What: Students launch into a study of old photographs taken in their school in the early decades of this century.

Where: The Island School in District 1

Why: Introduce students to the skills associated with the field of anthropology, as part of a year-long project to discover the lost history of their school.

FOCUS

As you watch, consider:

- What problems are the students tackling?
- Why is this activity *authentic?* What are the skills of the anthropologist?
- What skills are students applying?

PLAY TAPE

PAUSE TAPE FOR READING AND DISCUSSION

SUGGESTED TIME: 20-30 MINUTES

- Review Jackie Flannigan's planning guide and problem-based curricula in Units, Lessons, and Tools for more ideas in connection with problem-based approaches. Notice the planning guide and the way it is utilized in the problem-based curricula.
- Use the following discussion guidelines to assist you in exploring ways to incorporate a problem-based unit.

Discussion Guidelines

- Brainstorm with your colleagues on topics within your curriculum where you might use a problem-based learning approach. Identify experts or key people within your school who could act as mentors for the students in particular areas.
- Problem-based learning works well when the students have uninterrupted time to work.
- Discuss the pros and cons of reserving one week during a marking period in which students are fully engaged in a problem-based unit.
- Explain how basic skills can be integrated into the learning experience.
- Plan how you can use the resource personnel within the school to assist the students to become authentic problem solvers.

JACKIE FLANNIGAN'S PLANNING GUIDE

PROBLEM: Recover the lost history of P.S. 196

PURPOSE: Develop a multimedia project that reflects the history of the school, entitled "Then and Now"

AUDIENCE: Parents, students, and other members of the school community, school Web site visitors

CURRICULAR AREAS

LANGUAGE ARTS

•Word-web—"Moving"

•Read-aloud book: *The Magic Shell*

•Read-aloud book: *The Orphan of Ellis Island: A Time Travel Adventure.* Generate questions about immigrants' lives in early 1900s and address questions:

What was steerage like?

What was it like to communicate with other immigrants?

How would you overcome difficulties of being an immigrant in 1908?

How would you deal with:
Problems of language? Meeting new people? Earning a living? Living conditions? Working conditions? City living as opposed to country living?

• Compare your dreams with the reality of living on the Lower East Side.

•Read-aloud book: *John Burroughs: The Sage of Slabsides*

•Research on the Web: Who is John Burroughs?

The history of P.S. 196 and its community

•Read-aloud book: *Immigrant Kids.* Discuss:

What does the artist tell us about children in the late 1800s and early 1900s?

What are the children doing?

•Read-aloud book: *In Nueva York.* Discuss:

• How does a photographer convey feelings?

•Read-aloud book: *Computer Dictionary for Kids and Their Parents.* Discuss and read-aloud following handouts:

•Microsoft Power Point: Step by Step

•Power Point: Enhancing Your Slide's Appearance

•Tips for Using Microsoft's Power Point

•Introduce "My Story Board" worksheet. Draw pictures linked to text

•View "*Ellis Island*" Documentary, the History Channel. Write poem or illustrate picture of Ellis Island in 1920.

SOCIAL STUDIES

•Neighborhood walks: Explore the Lower East Side community.

•Field trip: The Lower East Side Tenement Museum. Use digital photography, sketch

pictures, take field trip notes for class book. Use scanner, Word '97.

•Field trip to El Museo del Barrio. Use digital photography, sketch pictures, take field trip notes for class book. Use scanner, Word '97.

•Field trip: Lower East Side Photo Gallery

•Compare and contrast features of original photos from the earliest days of P.S. 196

•Cooperative Group Activities. Discuss:

Moving: Why did you move? What did you leave behind? How old were you? What do you miss? What do you like about your move?

Basic reasons people left their countries to move to America

Imagine you're a new immigrant:

How can you play with children you can't talk to?

What would a typical day be like?

What problems might you have?

•Write about your dreams in 1908. Realities in 1908.

•Visit Web sites:

American Gateways Resources on Immigration and Migration to NYC

American Immigrant Home Page

Lower East Side Tenement Museum Web Page

Teaching Matters Resources for American Gateways; Ellis Island Home Page

American Gateways Project Settlement House Home Page

MATH

•Design a survey

•Collect and analyze quantitative data

•Design graphs, charts, school maps, and floor plans to communicate findings.

Survey questions and graphing chart:

Times you moved? Did your address move up or down number line?

What is the relationship between old and new address?

How was the move itself to your new address? What were similarities and differences in the moving days?

Under what circumstances might you and your family move thousands of miles away to a strange country?

Why would your family select America to settle in?

•Measurements: Create floor plans and maps.

•Map classrooms and other photo locations from past and present photographs; provide dimensions

COMBINATIONS OF SUPPORTING INTELLIGENCES AND ROLES NEEDED

LINGUISTIC—Writers, Anthropologists, Multimedia Producers

- Background reading about immigration
- Writing word webs
- Background reading: Handouts about Power Point, Web sites, Storyboards, etc.
- Field trip notes
- Write about your life if you were...
- Write about school, then and now, using Card Planning and "My Storyboard" worksheets
- Oral Histories: Interviews with actual alumni from the 1930s

LOGICAL-MATHEMATICAL—Anthropologists

- Planning surveys, collecting, graphing, and analyzing data
- Mapping and scaling photo locations

SPATIAL and NATURALIST—Multimedia Producers, Anthropologists

- "My Storyboard"
- Photograph Analysis
- Take digital photographs
- Prepare class trip books with original photos and drawings
- Produce Power Point presentations with illustrations, photos, and other graphic elements
- Create floor plans, school maps

INTERPERSONAL/INTRAPERSONAL—Anthropologists, Multimedia Producers

- Reflections and discussions about moving—own experiences, others' experiences
- Reflections and discussions about immigrant experiences, then and now
- Teamwork—creating the Power Point multimedia exhibit
- Recognition and respect for others' experiences and expertise
- Plan celebration party for visual and audio display of Power Point project; invite students, parents, and other members of school community

If possible, use the planning guide to contextualize your past experience or anticipated units. For suggestions, review following samples. An extra planning guide is provided.

PLANNING GUIDE

(Baum, Viens, Slatin with Gardner, in preparation)

PROBLEM:

PURPOSE:
AUDIENCE:
CURRICULAR AREAS ADDRESSED:

ROLES

ASSOCIATED INTELLIGENCES

UNITS, LESSONS, AND TOOLS

EARLY GRADES: THUNDER CAKE

(Baum, 1998)

In early childhood classrooms much of the curriculum revolves around a whole language and literacy approach. Creating problems from literature then becomes particularly appealing. Picture books today offer challenging possibilities from which to develop a problem-based curriculum in elementary and middle schools. Because sophisticated themes are introduced in these high quality visual products, the books offer a stimulus or jumping-off point for student inquiry.

A team of second-grade teachers used this favorite picture book to develop problem-based activities for their students. *Thunder Cake*, written and illustrated by Patricia Polacco, uses colorful folk art to acquaint students with Russian culture by using an experience shared by most children, the fear of a thunderstorm. Using the oral history method of handing down stories to younger generations about situations occurring in the past, Polacco assures young learners that throughout the course of time, approaching storms with thunder and lightning have frightened people everywhere. In *Thunder Cake*, a grandmother relates the story of how her grandmother helped her overcome her fear of thunderstorms by baking a special thunder cake before the storm arrived. The grandmother artfully describes the challenge of collecting the ingredients from places on the farm, while anticipating the closeness of the storm by counting the seconds between the flashes of lightning and the thunder claps that followed. Included is a recipe for a chocolate cake that uses tomatoes as an ingredient.

Thunder Cake's descriptive language and rich illustrations provide children with information and complex ideas. Truths like "Brave people can't be afraid of sounds" can lead to a lively discussion. Ways to overcome unfounded fears offer avenues to critical and creative thinking. Vocabulary words, like babushka, samovar, wood stove, dry shed, and trellis increase the vocabulary in all youngsters. Polacco's verbal descriptions of the sound of thunder introduce the idea of onomatopoeia to the youngsters, as they become involved with the challenge of baking a special cake before the storm arrives.

Polacco's artistry reveals intricate visual patterns in the illustrations, from quilts on the chair to woven tablecloths. Embedded within the story are a variety of disciplines—the art of quilt making, meteorology, chemistry, psychology, and agriculture, to name a few.

This book offered these teachers sufficient complexity to use the story to initiate a number of learning excursions or bases for problem-based learning. To think of ideas, they first listed possible problems for consideration.

Some of their ideas:

•designing a quilt to tell a story or to commemorate an event;

•becoming social scientists by examining fears students have in the primary grades

•developing a school weather station to investigate weather patterns

•forming a kitchen chemistry group to investigate how tomatoes and other ingredients affect the cake

•storytelling across generations: acting as anthropologists and sociologists, and examining the relationships between youngsters and their grandparents

The teachers agreed that these themes could be developed into problem-based activities for the young kitchen chemists, quilt-makers, psychologists, anthropologists, or meteorologists in their rooms. Each of these domains requires a different spectrum of intelligences, as the children engage in inquiry and develop products to communicate their results. Authentically engaging in the problems allows the children to enjoy real-world problem solving and creativity, applying the basic skills of the curriculum.

PROBLEM 1

The Quilting Society of America is commissioning the production of an original quilt to honor grandparents. To be considered, the quilt must have original symbols and patterns to portray the importance of the role grandparents play in the lives of their grandchildren. In this problem the spatial and interpersonal intelligences will be needed as well as kinesthetic talent to make the quilt. Its presentation may involve those students who can plan and implement such an event.

PROBLEM 2

Students want to know if one can predict how close a storm is by measuring the time between the thunder and lightning, as indicated in the story. Can they set up a weather station to detect weather patterns and develop theories to help predict the weather?

In this problem, the young naturalists and scientists work with classroom engineers to design instruments, observe patterns, and develop formula for predicting the weather.

PROBLEM 3

The Commission on the Study of Fears in Children has hired you. They want to know what students your age are afraid of and how to let other children know that they are not alone in their fears.

This problem may be appealing to children who are high in both interpersonal and intrapersonal intelligence. It can offer opportunities for data collection and reporting results using creative graphs for mathematical and spatial thinkers. Writers can help report the findings. Different students can assume different responsibilities in their research and development team.

DEVELOPING THE PLAN

The following plan illustrates how one of the teachers developed activities in connection with problem 3. She hoped to have students report the results of their inquiry by writing an article for submission to Creative Kids, a journal by kids for kids. In the article the students will share their findings with other students who read the journal—just as social scientists communicate the results of their studies. The planning guide shown below indicates how all the components of this kind of learning interact to offer students an opportunity to use their strengths and apply basic skills to solve problems and develop products.

PROBLEM: What are children afraid of and how can they overcome their fears?

PURPOSE: Help children to realize that everyone has fears and that there are ways to overcome them.

AUDIENCE: Young readers of Creative Kids

CURRICULAR AREAS ADDRESSED

Math

Designing a survey

Collecting and analyzing quantitative data

Designing graphs and charts to communicate findings

Language arts

Reading background information and writing the article for Creative Kids

Social Studies

Recognizing and communicating understanding of individual differences

TALENTS NEEDED

Linguistic

Writers for article in Creative Kids

Writers for wording the questionnaire

Logical-Mathematical

Researchers for data collection and analysis

Spatial

Designers of graphs and illustrations for article

Naturalists

Examining categories of types of fears and possible origins of fears

Interpersonal/Intrapersonal

Young psychologists to interpret findings and develop solutions for overcoming fears

MIDDLE SCHOOL: The Pond Problem

(Baum, Nue & Cooper, 1997)

A popular setting for problem-based learning is at the middle school where the philosophy supports the idea that students need to be actively engaged in their learning. Particular attention is given to motivating students and giving them opportunities to apply basic skills to real-world activities. The following vignette is an example of how problem-based learning was used with a group of middle school students who had been identified as having special learning needs but who also had talents in one or more of the following areas: visual arts, performing arts, science, and engineering. These students were participating in Project High Hopes: a three-year federally funded project designed to promote talent in students not usually selected for gifted programs.

One part of this three-year Javits project was a one-week institute in which students worked on an interdisciplinary team to solve a problem. The class of 27 students was divided into five research and development teams called companies and invited to solve a problem associated with the badly deteriorating pond located on site. Within the week, each company was to produce a proposal containing a creative solution for reconstructing the pond. The composition of the companies was intentional. Students were placed in a company based on the expertise they could offer the group. The areas of expertise for this simulation were engineering and design, biological science, visual arts, and performing arts. All these abilities were needed to effectively analyze the problem, develop a plan for confronting the problem, and communicate their ideas effectively and professionally to a board of directors representing the school.

Learning took place in an advanced-level laboratory environment in which teachers served as coaches and facilitators as the companies met to consider the proposal. Different members of the companies assumed the major responsibilities for certain aspects of the process. For instance, all the students went to the pond to collect information. However, the biologists analyzed the flora and fauna, the engineers studied the dam and other structures as well as land topography. In one company, the performing artists wanted to become the resident animals and study the problem metaphorically by merging themselves with the problem. The visual artists made sketches and took photographs as a means of collecting relevant data.

As their plans evolved, the students could consult with content-area specialists in professionally equipped settings. The biologists from each company brought specimens to the science lab where these young scientists could study them under the microscope and discuss their hypotheses with the mentor biologist assigned to the lab. The engineers spent time in the engineering lab with their mentor where they built models and made prototypes to scale of new bridges and dams or nature trails that they envisioned. The visual artists had an art studio where they created sketches and murals of their ideas. The performing artists as well as other members of the team who would present the ideas to the board worked with the performing artist mentor to polish their verbal communication skills and approaches. Each laboratory contained authentic equipment and materials used by the practicing professional.

The students were engaged morning and afternoon from Monday through Friday noon on their proposals. On Friday afternoon, each research and development company presented its proposed solution for reconstructing the pond. Combining artistically enhanced overhead transparencies, video-clips, 3-D models, and dramatic performances, students illustrated both the deteriorating pond conditions they had analyzed and their respective group's recommendations for correcting the problems. The proposals included a scientific rationale, an estimated budget, and a media presentation designed to promote the plan in its best light.

Not only does this kind of teaching allow a variety of multiple intelligences, but it also promotes in-depth understandings of the environmental issues involved and real-world application of academic skills. The chart below illustrates these aspects.

PROBLEM: Deteriorating pond, and its influence on the ecological environment

PURPOSE: To develop a proposal to remedy the problem

AUDIENCE: Board of Directors of the school

CURRICULAR AREAS ADDRESSED

Science

Ecology, environment, pollution

Math

Scale drawings and model building, budget

Communication Skills

Use of visuals, verbal presentations, drama techniques

Organization Skills

Task analysis and time management

ROLES NEEDED

Authors **(Associated intelligence: linguistic)**

Writing the proposal

Background reading about topics

Scientists **(Associated intelligences: logical-mathematical, naturalist)**

Recognition of patterns and disruptions in ecology

Scientific analysis of pond issues

Estimation of budget

Design for nature trail

Visual artists **(Associated intelligences: spatial and naturalist)**

Photography

Visualization of solutions through murals, sketches

Topography

Engineers and Performing Artist **(Associated intelligence: bodily kinesthetic)**

Engineering—building scale models

Drama—Movement and becoming animals; effective use of dramatic techniques like tableau for presentations

Advocate **(Associated intelligence: interpersonal)**

Recognition and respect for other's expertise

As seen in the planning guide below, the major areas of expertise needed were spatial, mathematical, and kinesthetic. Personal intelligences flowed naturally as students understood their areas of expertise, the goal for which they were aiming, and how they could contribute to the proposal. The role of linguistic intelligence was secondary to other types of problem solving strategies and products, thereby minimizing many of the problems usually experienced by students classified as special education students. In fact, in problem-based learning, the goal is to tap students' strengths rather than stress weaknesses. The students assumed the role of practicing professionals using the methods, tools, and products of particular domains.

PLANNING GUIDE

PROBLEM:

PURPOSE:

AUDIENCE:

CURRICULAR AREAS ADDRESSED:

ROLES NEEDED	ASSOCIATED INTELLIGENCE(S)
	Linguistic, logical-mathematical

RESOURCES

Eberle, B., and B. Stanish. CPS (Creative Problem Solving) for Kids. Buffalo, NY: D.O.K., 1980.
This resource introduces students to a 6-step strategy for solving authentic problems.

Renzulli, J. S. *Enrichment Triad Model.* Mansfield Center, CT: Creative Learning Press, 1977.
A classic book that explains how to transform students from lesson learners to creators of new knowledge.

Stepein, W. *A Guide for Designing Problem-based Instructional Materials.* Geneva, IL: Human Learning Resources, Inc., 1995.
This is a wonderful guide for developing problem-based learning opportunities in the classroom. The author carefully outlines a 10-step procedure that is needed to develop instructional units.

Wigginton, E. *A Foxfire Christmas,* 1982.
This is one of a series of books based on students becoming anthropologists and immersing themselves in the Appalachian culture. These inquiry projects integrate all areas of the curriculum and serve as a model for problem-based learning.

Creative Learning Press offers materials that allow students to solve problems by using authentic methods of a discipline. Some resources include:

Save the Earth: An Action Handbook for Kids by Betty Miles

The Amateur Geologist by Raymond Wiggers

Kid's Guide to Social Action by Barbara Lewis

Kids with Courage: True Stories about Young People Making a Difference by Barbara Lewis

Kid's Guide to Service Projects: Over 500 Service Ideas for Young People Who Want to Make a Difference by Barbara Lewis.

WORK CITED

Baum S., Slatin B., Viens J., with Gardner H. *Multiple Intelligence in the Elementary Classroom: A Guide to Thoughtful Practice.* NY: Teachers College Press, 1999.

Krechevsky, M., and S. Seidel. "Minds at Work: Applying Multiple Intelligences in the Classroom." In: Sternberg, J. and Williams, W., eds. *Intelligence, Instruction and Assessment.* Mahwah, NJ: Lawrence Erlbaum, 1998.

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Module VI
MI THEORY AND TALENT DEVELOPMENT

OBJECTIVE

- Explore applications of MI theory to identify talent in students and provide opportunities for talent development both within and outside the curriculum.

VIDEO GUIDE

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TALENT DEVELOPMENT IN THE CONTEXT OF NYC SCHOOLS

When we were looking at the previous applications of MI, we discovered distinctive talents in several students. For example, in our module on Deepening Understanding, we discovered Keegan, a talented young artist from a third-grade class at the Lower East Side School. At the Charles R. Drew Middle School in District 9, we discovered Alberta, a talented actress, during an exploratory activity in improvisation. When we use MI theory in the classroom, we discover certain students with high levels of talent in particular areas. The more we expose students to opportunities to use and develop their unique profiles of multiple intelligences, the more we'll see students showing us their potential for gifted behaviors—by which we mean above-average ability, creativity, and task commitment in a particular discipline (Renzulli, 1985). We all often feel the frustration of not being able to do more to develop our students' talents. However, if a school decides that talent development should be an important part of its program, teachers and administrators, and often parents, have drawn on both internal and external resources to give students a chance to develop their gifts. This tape will show you several of these examples.

MI THEORY AND TALENT DEVELOPMENT

Multiple intelligences theory supports the view that students exhibit a diversity of talents that can be nurtured. This theory offers us a frame for creating a continuum of services where we can both recognize the talents of students and plan experiences to develop their talents. The opportunities within this continuum range from options within the regular curriculum that enable students to explore many domains and discover their strengths and interests, to a variety of enrichment and talent development activities outside of the regular curriculum, relating to specific interests and identified talents. Using a talent development approach provides all students with challenge and high interest learning in the regular classroom. The activities outside of the regular curriculum offer students opportunities to pursue their own interests and talents in their own right.

WHAT WE MEAN BY "TALENT"

Traditional gifted and talented programs limit access to those students with high scores on IQ tests. This approach disregards MI theory.

MI theory nicely complements the "three ring conception of giftedness" put forward by Dr. Joseph S. Renzulli at the National Research Center on the Gifted and Talented. He writes: "Research on creative/productive people has consistently shown that although no single criterion can be used to determine giftedness, persons who have achieved recognition because of their unique contributions possess a relatively well defined set of three interlocking clusters of traits. These clusters consist of above-average though not necessarily superior ability, task commitment, and creativity. It is important to point out that no single cluster 'makes giftedness.' Rather, it is the interaction among the three clusters that research has shown to be the necessary ingredient for creative/productive accomplishment" (J.S. Renzulli, 1977).

STRATEGIES FOR TALENT DEVELOPMENT

Talent development programs can exist both within the curriculum and in extracurricular programs. Individual teachers have an important role to play, in both helping to identify students' talents and, in many instances, as content specialists.

One of the keys to talent development programs is the presence of content specialists, serving as mentors. Content specialists may be outside professionals, parents, and teachers. As experts, they offer young learners the advanced-level knowledge, methods, and materials of their disciplines.

There are many ways to provide opportunities for talent development. The essential components are recognizing the talent and providing opportunities to develop that talent, using a highly knowledgeable adult facilitator or mentor. When students are in the initial stages of talent development, opportunities can be more informal and can be used to identify the level of talent, interest, and commitment shown. As students' talents develop, they will need increasingly challenging opportunities to help them become creative producers. Finally, when they are ready for a more rigorous program, a more formal identification procedure is needed, coupled with talent development experiences conducted by experts within a domain.

This module tracks talent development along the continuum from novice to expert. The schools and programs are not traditional Gifted and Talented programs based on IQ scores. Instead, they have a continuum of programs for students, both within the curriculum and in extracurricular programs. It's significant that many students overcome a history of poor performance in academic subjects because their school experience includes talent development opportunities.

PROVIDE SCHOOLWIDE ENRICHMENT OPPORTUNITIES FOR ALL STUDENTS

By using a multiple intelligences approach to teaching and learning, all students can explore their abilities in a variety of contexts. This step is especially necessary to equal the playing field for those students who haven't been exposed to a variety of domains outside of school (Baum, et.al., in press). Also, it allows students to understand that there are many ways to be smart and that we value them all.

Because the regular curriculum prescribes much of the content and activities within classrooms, it is necessary to offer students ways to develop their strengths and interests in their own right. Such experiences help to identify talent in students who are not faring well in the regular curriculum.

CONTINUUM OF SERVICES FOR TALENT DEVELOPMENT

(Baum, et. al., in press)

ENRICHING THE CURRICULUM	TALENT DEVELOPMENT OPPORTUNITIES	SELECTION OR IDENTIFICATION
	• Differentiation based on interests and strengths • Multiple Intelligences perspective • Critical and creative thinking exercises • Interest centers • Project options	• Informal observation • Product assessment
SCHOOLWIDE ENRICHMENT MODEL [Renzulli]	• Speakers, mini-courses • Enrichment clusters • Group training activities [Type II] • Individual and small-group investigation of a real problem [Type III]	• Interests, strengths, self-selections, nominations
SPECIALIZED MODELS	• Talent development classes • AP classes • Specialized schools • Internships	• Nominations, formal application procedures, try outs

RENZULLI'S SCHOOLWIDE ENRICHMENT MODEL

ENRICHMENT CLUSTERS

Enrichment clusters are nongraded groups of students and adults who share common interests and come together during specially designated time blocks to pursue these interests by developing a product or a service for some real purpose. The group sets its own goals from which the curriculum evolves. The clusters are organized around major disciplines, interdisciplinary themes, or cross-disciplinary topics, thereby allowing for the expression of multiple intelligences. A major assumption is that every child can contribute something of worth if educators create conditions in which that child can be a specialist within a specialty group. The students volunteer for a cluster based on interest and contribute based on their own talent or expertise. (For more information about enrichment clusters see Renzulli, J.S., & Reis, S.M., 1997. *The Schoolwide Enrichment Model: A How-to Guide for Educational Excellence.* CT: Creative Learning Press.)

Students may engage in enrichment programs in different ways. At the Island School, for example, many enrichment activities are offered to every student who shows interest. If and when these students demonstrate talent in a given activity, they will be offered higher levels of training.

GENERAL EXPLORATORY: TYPE I ACTIVITIES

These activities are designed to introduce topics to all students as a means of exciting them in new areas of interest. Activities include field trips, films, visits, interviews, television documentaries, professional magazines or journals, and guest speakers who may be experts on specific topics.

It is important to note that students are not evaluated on these experiences. Instead, the teacher is to observe the students' levels of interest in the topic area.

GROUP TRAINING ACTIVITIES: TYPE II ACTIVITIES

These activities use methods, materials, and instructional techniques that are mainly concerned with the development of thinking and feeling processes. They enhance a student's skills within a discipline; in other words, how to solve problems in that discipline and create like practicing professionals in the discipline. In addition, general skills in thinking and creativity are offered. These abilities are categorized as thinking process skills, how-to-learn skills, advanced researching skills, and communication skills. These skills are necessary for students to develop their creative products.

INDIVIDUAL OR SMALL-GROUP INVESTIGATION OF A REAL PROBLEM: TYPE III ACTIVITIES

These experiences encourage students to assume the role of the practicing professional or first-hand inquirer in their pursuit of a problem or issue. They use authentic methods and instruments to develop products or solutions, and, like adult creative producers, they share their results with concerned audiences. This type of problem solving was mentioned in Module V. The major difference is that the focus is on student interests, not on the prescribed curriculum. Any one activity is contingent on a student's level of expertise and interest.

SPECIALIZED MODELS

A final component of Renzulli's model is to provide opportunities to students who have been identified through a formal identification process. They provide targeted instruction within a discipline during or after school. Teachers with special expertise or outside professionals may be responsible for these classes and opportunities.

IDENTIFICATION OF TALENT FROM AN MI PERSPECTIVE

Identification from an MI perspective must be authentic to a domain. Auditions, observations, and products provide the information as opposed to test scores and IQ assessments.

VIDEO GUIDE

SEGMENT 1: P.S. 42

WHAT TO EXPECT: AUDITIONS

Who: Debbie Rabbai and A.J. Mass, actors from Freestyle Repertory Company

What: Conduct their first audition with a class of fourth graders.

Where: P.S. 42 in District 9, with a schoolwide program funded by a Jacob Javitz grant

Why: To illustrate one method of authentic identification of talent (in the performing arts)

FOCUS

As you watch, consider the activities in which the students are engaged. To what extent do they align with the MI requirement for authentic assessments?

PLAY TAPE

PAUSE TAPE FOR DISCUSSION: IDENTIFYING TALENT IN YOUR STUDENTS

SUGGESTED TIME: 5-10 MINUTES

Have you noticed special talents in your own students?

Have you noticed more examples of talents since you've been using MI?

Share with others in your group what resources you've found to help students develop their talents, or frustrations you've felt if you've not yet been able to help them.

To see how "project high hopes" identified talent in visual arts among a group of special education middle school students, refer to readings at the end of this module.

YOUR NOTES

SEGMENT 2: THE ISLAND SCHOOL

BACKGROUND

This Peer Mediation program evolved as part of the Island School's vision of developing a broad range of talents in its students. In this program the principal and her staff identified students who had strength in interpersonal intelligence, evidenced by their leadership ability. Their academic performance was not a factor in their selection.

In developing peer mediation talent, student participants were to demonstrate new abilities. At the same time, their efforts had a positive impact on the school. The Educators for Social Responsibility Peer Mediation Model provided an opportunity to develop leadership among students. Tameeka Ford, as the former head of the Partnership for Children within the school, headed up a group of staff members who were trained to facilitate this model.

WHAT TO EXPECT: LUNCH WITH PEER MEDIATORS

Who: Tameeka Ford and Peer Mediators

What: Practice peer mediation skills and discuss school problems

Where: The Island School in District 1

Why: To illustrate a program to develop students with talent in the personal intelligences

FOCUS

As you watch, consider

- Talent of individual students
- How profiles of intelligence aligned with the program
- Consistency between the identification of talent in students and the program itself

PLAY TAPE

PAUSE TAPE FOR DISCUSSION: DEVELOPING STUDENTS WITH STRONG PERSONAL INTELLIGENCES

SUGGESTED TIME: 15 - 20 MINUTES

Ms. Ford, who is a social worker by training and who has strong interpersonal skills herself, was looking for similar strengths in her selection of peer mediators. In the selection process, and through informal observations at lunch, she looked for students who were articulate, had strong leadership skills, and who appeared to be outspoken with their peers.

1. Identify your own areas of strength, whether or not a traditional academic discipline.

2. List five behaviors you would expect to observe that might demonstrate above-average ability and creativity within your strength area. Choose one strength area only.

1.

2.

3.

4.

5.

3. Think of one or more ways you might identify these behaviors in students. This could be a formal audition, such as the ArtsConnection's audition process you saw in the previous video segment, or purposeful observations within various school contexts, such as lunchtime, etc.

SEGMENT 3: LOUIS ARMSTRONG MIDDLE SCHOOL

BACKGROUND

Marie Turini, a math teacher, guides her 5th- and 6th-grade students in a process that teaches them to conduct authentic research and do inferential statistics. Ms. Turini uses *Chi Square Pi Charts and Me* (Baum, Gable, and List, 1987) as the basis for this long-term investigation activity. [See excerpts in Units, Lesson, and Tools.]

WHAT TO EXPECT: JUNIOR STATISTICIANS

Who: Marie Turini and Junior Statisticians [a club for students with talent in math]

What: Students develop their talents through an authentic investigation process, using (and learning) appropriate methods of inquiry and analysis in the process

Where: Louis Armstrong Middle School

Why: To illustrate a program that develops students with talent in logical-mathematical intelligence.

FOCUS

As you watch, consider these program characteristics:

- Real-world problems
- Employing the methods of the discipline
- Academic rigor
- Interest-based

PLAY TAPE
PAUSE TAPE
DISCUSSION

SUGGESTED TIME 5 MINUTES

Ms. Turini is helping her students conduct a Type III investigation, to develop their talents in real-world mathematical as well as other intelligences. Type III investigations, in general, contain the following:

- A student or small group of students with above-average ability in one or more intelligences, with an idea or interest and commitment to pursue a topic or problem
- A teacher with appropriate knowledge and skills who assists in these ways:

  Helps students find/focus on a topic or problem

  Provides human and material resources (teacher as managerial assistant)

  Provides focus on the methodology or "how-to-do-it" in a particular field

  Provides feedback, encouragement, editorial assistance, and a shoulder to cry on

  Assists students to manicure, revise, rewrite, and polish the product

  Finds appropriate audiences and outlets for students' work.

Discuss the Type III experiences for talent development in your school.

- Is it possible to offer any (or more) of these programs?
- If so, what additional resources would be needed and what might you do to secure them?

Review excerpts from *Chi Square Pie Charts and Me* in Units, Lessons, and Tools and discuss possible applications with your students.

YOUR NOTES

SEGMENT 4: EDWARD R. MURROW HIGH SCHOOL

BACKGROUND

Scott Martin has been teaching and directing plays at Edward R. Murrow High School for 18 years. He and his five professional colleagues in The Player's Circle, the Murrow theatre program, have all trained and worked in professional theatre, and offer a rigorous cocurricular program in acting, musical theatre, technical theatre, dramatic literature, and play writing.

The Player's Circle is just one example of talent development at Murrow. Get in touch with the Murrow school (see the resource list at the end of this module) to learn more about their cocurricular range of talent development opportunities.

WHAT TO EXPECT: THEATRE ARTS

Who: Scott Martin and Murrow's theatre arts students

What: Mr. Martin talks about theatre arts program, illustrated by classroom and rehearsal scenes

Where: Edward R. Murrow High School

Why: To illustrate a specialized model for talent development in theatre arts

FOCUS

As you watch, consider the demonstration of gifted behavior, in particular

- above-average ability
- creativity
- task commitment

PLAY TAPE

PAUSE TAPE FOR DISCUSSION: MI AND THEATRE ARTS

SUGGESTED TIME: 5 MINUTES

What combinations of intelligences are likely to be developed in the following disciplines:

- Acting?
- Musical performances?
- Dance?
- Set design?
- Lighting design, rigging and running lights?
- Sound design, mixing sound?
- Costume design and preparation?
- Directing?
- Set construction?
- Playwright?
- Theatre management?

FROM NOVICE TO EXPERT

BACKGROUND

ArtsConnection, New York City's largest and most comprehensive arts-in-education organization, was founded in 1979 to provide professional programs in the performing arts to children in the NYC public schools. Dedicated to linking cultural resources to the learning needs of children, ArtsConnection believes that through the arts all people—especially children—can develop curiosity, love of learning, imaginative thinking, a positive self-image and respect for their own and their neighbors' cultural heritage. ArtsConnection has extended programming beyond traditional school hours at the ArtsConnection Center, where they present performances and workshops specially designed for families and the general public.

The young musicians featured in this segment were identified when they were in third grade in an ArtsConnection collaboration with P.S. 130 in District 15. The program, "Talent Beyond Words," was funded by the Jacob Javits Program from the U.S. Dept. of Education.

The journey from novice to expert began for these students when they were chosen, among twenty-seven classmates who were identified with musical talent (from four third-grade classes). Fifteen of the original group continued to study music in Saturday programs at ArtsConnection. Six students continued serious music education (including Juilliard classes) through high school.

They continued to work with David Pleasant of RIDIMATHON when he left ArtsConnection to form RIDIMATHON and Now Grio, a professional group specializing in polyrhythmic music.

WHAT TO EXPECT

Who: ArtsConnection, David Pleasant and young musicians

What: Students and mentor tell their stories

Where: MI Institute

Why: The journey of musically talented students from 3rd grade to high school graduation

FOCUS

As you watch, consider the demonstration of gifted behavior, in particular

- the identification process
- rigor of program
- impact on students

PLAY TAPE
PAUSE TAPE FOR THOUGHT QUESTIONS

The Journey From Novice to Expert

How important do you think talent development is as a goal for education? How does a talent development philosophy align with your school's self-stated vision and goals?

What are the implications of MI theory for gifted education?

Where is your school on the continuum of talent development?

How can you use MI theory to broaden your personal definition of giftedness?

FINAL ACTIVITY

Some schools allow the specialists like the art, computer, music, and science teachers to work with a multi-aged group of students talented in their particular domains. Meet with the specialists in your school to discuss this idea. How might they be given time to work with the students? How might they identify which students would participate? How feasible is the idea in your school?

UNITS, LESSONS, AND TOOLS

TALENT DISCOVERY ASSESSMENT PROCESS (TDAP)

Susan M. Baum, Ph.D.
Terry W. Neu, Ph.D.
Steven V. Owen, Ph.D.

OVERVIEW

The Talent Discovery Assessment Process (TDAP) was designed to assess potential talent in the arts and sciences for special needs students in grades 5-8. Historically, assessment procedures involving pencil-and-paper tasks have been shown to inhibit the emergence of specific abilities in students with special needs. The TDAP, however, is based on the philosophy that the most accurate predictor of potential talent is observations of student behaviors over time when they are engaged in authentic activities within specific domains.

The targeted behaviors indicating domain-specific talents are derived from Renzulli's three-ring conception of giftedness above-average ability, creativity, and task commitment, or interest (1978). The TDAP has identified domain- specific, observable behaviors of these traits as they relate to the visual arts, dramatic arts, physical and life sciences, and engineering.*

Three of the domains are further divided into specific areas as follows:

- Performing Arts
  - — Drama
  - — Movement
- Visual Arts
  - — Drawing (2-dimensional)
  - — Sculpting (3-dimensional)
- Physical and Life Sciences
  - — Zoology
  - — Botany
  - — Physics

The specific behaviors observed are displayed in Figure 1.

* Specific sections of the Talent Discovery Assessment Process may be used depending on which talents are being considered for development.

Performing Arts	Visual Arts	Science	Engineering
1. Uses facial expressions effectively. 2. Uses expressive voice. 3. Uses body language effectively. 4. Communicates intent clearly. 5. Creates elaborate movements, skits, or characters. 6. Accepts and incorporates others' feedback.	1. Achieves balance in his/her artwork. 2. Uses form (dimensionality) and design to produce the desired effect. 3. Communicates his/her intent clearly. 4. Creates a unified design that relates parts to the whole and uses appropriate inclusion/exclusion ratio. 5. Experiments with different ideas, materials, or techniques. 6. Combines disparate parts to create a unique solution. 7. Uses detail to show complexity of ideas. 8. Uses tools and materials effectively. 9. Accepts and incorporates others' feedback. 10. Is able to talk about work.	1. Displays curiosity by asking relevant questions. 2. Shows considerable knowledge related to session topics. 3. Actively manipulates materials. 4. Communicates clearly the results of the project. 5. Systematically tests hypotheses. 6. Tries to predict outcomes. 7. Represents ideas in the form of a model. 8. Finds means of overcoming obstacles in problem solving.	1. Actively manipulates materials. 2. Tries to predict outcomes. 3. Understands the main concepts of each lesson's topics. 4. Creates a product that shows clarity of thought and focused plan of action. 5. Puts materials together in a unique way. 6. Explains the logic of alternative solutions. 7. Shows problem-solving skill by pursuing an unprompted investigation. 8. Observes patterns in experimentation. 9. Finds means of overcoming obstacles in solving problems.

Figure 1. Talent Discovery Behaviors (Revised)

From "Chi Square and Me" by Susan Baum
Adapted for Ms. Turini's "Junior Statisticians"

The Management Plan for Research

Name _____

Date _____

Class _____

1. **Identify Your Research Problem**
or any area you wish to investigate.
(Note: Webbing may be used to identify different aspects of the problem.)

_____

_____

2. **State Your Research Question.**
Circle variable (from webbing if used) that you wish to consider, draw arrows to any specific examples you wish to investigate in the web.

_____

_____

_____

3. **Review the Research Literature.**
List your sources of information.

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

4. **State the Hypothesis**
Remember to state the relationship between variables, in statement form. In addition, make sure the variables are testable.

Identify the Variables

Independent: _____

Dependent: _____

_____

_____

_____

5. **Select the Research Design**
___Historical
___Descriptive
___Qualitative
___Correlational
___Experimental
___Quasi-Experimental
___Causal-Comparative

Design: _____

_____

_____

6. **Gather the Data**
a. Sample

who _____

how many _____

type of sampling procedure _____

_____

b. Data Collection Methods

___ observation _____

___ documents _____
(photo albums, diaries, journals, recorded information)

___ interviews _____

___ surveys _____

___ tests/scores _____

7. **Data Analysis**

Descriptive _____

___ Correlation df ___ level of significance ___

___ t-Test df ___ level of significance ___

___ Chi Square df ___ level of significance ___

8. **Presentation of the Study**

Audience _____

Product _____

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RESOURCES

National Association for Gifted Students
1701 L Street NW, Suite 550
Washington, DC 20036
(202) 785-4268
www.nagc.org

National Research Center on the Gifted and Talented
The University of Connecticut
362 Fairfield Road, U-7
Storrs, CT 06269-2007
(860) 486-4826

Edward R. Murrow High School
James Kingston, Assistant Principal
(718) 258-9283 ext. 122

ArtsConnection
120 West 46th Street
New York, NY 10036
(212) 302-7433

P.S. 196 / The Island School
Barbara Slatin, Principal
442 East Houston Street
New York, NY 10002
(212) 677-5710

These resources provide more in-depth information about talent development.

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Csikszentmihalyi, M., Rathunde, K., and S. Whalen. *Talented Teenagers: The Roots of Success and Failure.* NY: Cambridge University Press, 1993.

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